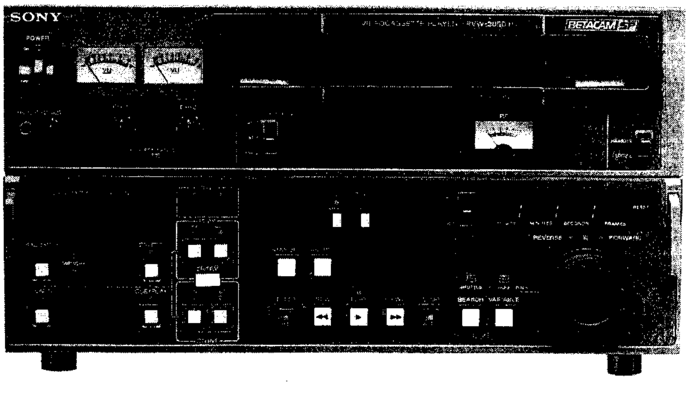
SONY®

VIDEOCASSETTE PLAYER

PVW-2650P

SERVICE MANUAL

Vol.1 1st Edition
Serial No.10001 and Higher



BETACAM SP
2000PRO

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SECTION 1
INSTALLATION

Be sure to install the PVW-2650P in locations satisfying the required operational environment described below to assure the PVW-2650P's superior performance and to maintain the excellent serviceability and accessibility.

1-1. OPERATIONAL ENVIRONMENT

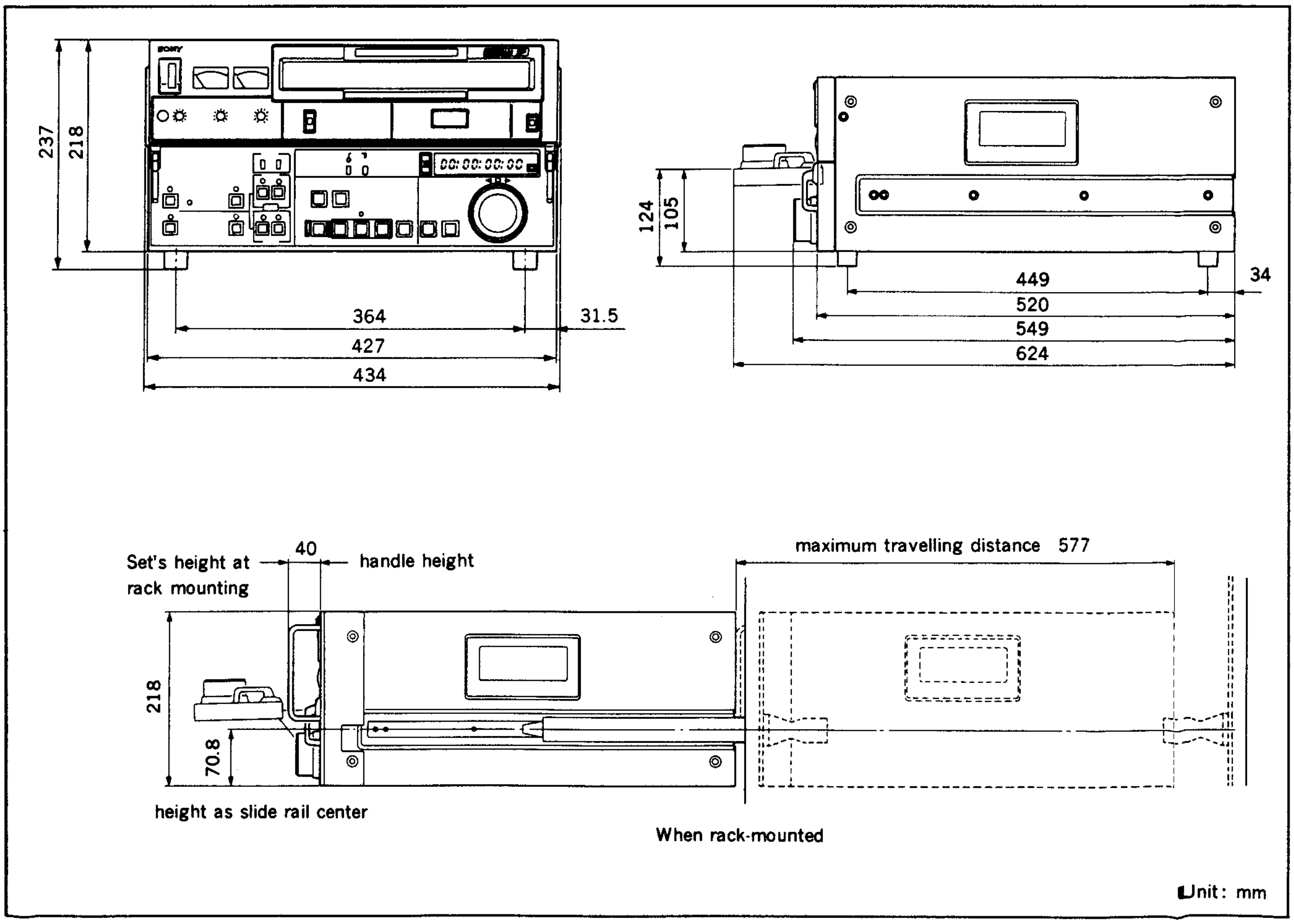
- Operating temperature : +5 °C to +40 °C
  (Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation. Do not block the ventilation holes on the cabinet and the rear panel.)
- Humidity : 80% or less
- Storage temperature : −20 °C to +60 °C
- Locations to avoid :
  - Areas where the unit will be exposed to direct sunlight or any other strong lights.
  - Dusty areas or areas where it is subject to vibration.
  - Areas with strong electric or magnetic fields.
  - Areas near heat sources.

1-2. INSTALLATION

1-2-1. Installation Space

(1) The rear side must be at least 40 cm away from the walls for ventilation and maintenance.

(2) When the unit is operated on a desk or similar condition, assure that the clearance above the unit is at least 40 cm to provide accessibility to the printed circuit boards and other mechanical parts. Note that it is not necessary to provide the space when the unit is mounted in a rack since the printed circuit boards can be repaired after it is pulled out.


237
218
364
31.5
427
434
124
105
449
34
520
549
624
Set's height at rack mounting
40
handle height
218
70.8
height as slide rail center
maximum travelling distance 577
When rack-mounted
Unit: mm

1-2-2. Installation Setup and Adjustment

When the unit is installed, be sure to perform the following setup and adjustment. If the adjustment is not performed, the unit may not oprerate properly.
Refer to the operation manual “Chapter 3 Setting Up the Unit” for setup and adjustment.

(1) 75 Ω termination switch setting : 75 Ω ON/OFF

Further, under the applications, perform the following setup and adjustment.

- In case of performing time code editing.
  (1) Time code reader mode setting
- In case of using as editing system.
  (1) Put the reference video signal to REF. VIDEO IN connector.
  (2) H system phase adjustment
  (3) SC system phase adjustment

1-3. OPERATING VOLTAGE

• Power voltage	: 90-264 V ac
• Power frequency	: 48-64 Hz
• Power consumption	: 130 W

1-4. MATCHING CONNECTORS AND CABLES

When external cables are connected to the connector on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

PVW-2650P side Connector	Matching Connector/Cable	
Panel Indication	**Connector/Cable**	**Sony Part No.**
VIDEO INPUT REF. VIDEO	BNC, MALE	1-560-069-11
VIDEO OUTPUT 1/2/3 REF. VIDEO COMPONENT 2 (Y, R-Y, B-Y)	BNC, MALE	1-560-069-11
COMPONENT 1	PLUG, 12P, MALE	1-560-995-00
DUB (U-matic)	PLUG, 7P, MALE	1-508-948-00
	VDC-3 (3 m) VDC-5 (5 m)	optional accessory
S-VIDEO	YC-15V (1.5 m)	optional accessory
AUDIO OUTPUT CH-1/CH-2/MONITOR	XLR 3P, FEMALE	1-508-083-00
TIME CODE OUT	BNC, MALE	1-560-069-11
MONITOR	RECTANGULAR, 8P, MALE	1-506-161-00
TBC REMOTE	CONNECTOR, D-SUB 15P, FEMALE and JUNCTION SHELL, 15P	1-561-610-21 1-561-929-00
REMOTE	CONNECTOR, D-SUB 9P, MALE and JUNCTION SHELL, 9P	1-560-651-00 1-561-749-00
	RCC-5G (5 m) RCC-10G (10 m) RCC-30G (30 m)	optional accessory

1-5. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

INPUT

REF VIDEO : BNC×2 (bridging connection)
Black burst or composite video 1.0±0.3 V p-p, 75 Ω (ON/OFF), sync negative

OUTPUT

REF VIDEO : BNC
Black burst, 75 Ω, sync negative

VIDEO OUTPUT 1/2/3 : BNC×3
Composite video, 1.0 V p-p, 75 Ω, sync negative
Superimposed time code etc. output from VIDEO OUTPUT 3, as specified by CHARACTER switch on the sub control panel.

COMPONENT 1 : Circular 12 pin
Y : 1.0 V p-p, 75 Ω, sync negative
R-Y : 0.7 V p-p, 75 Ω
B-Y : 0.7 V p-p, 75 Ω

COMPONENT 2 : BNC×3
Y : 1.0 V p-p, 75 Ω, sync negative
R-Y : 0.7 V p-p, 75 Ω
B-Y : 0.7 V p-p, 75 Ω

DUB (U-matic) (with an optional BKW-2030) : Circular 7 pin
Y : 0.5 V p-p (75 Ω load)
C : 0.5 V p-p (75 Ω load)

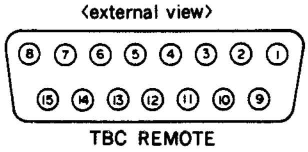
S-VIDEO : Circular 4 pin
Y : 1.0 V p-p, 75 Ω, sync negative
C : 0.7 V p-p, 75 Ω (burst 0.286 V p-p)

AUDIO OUTPUT CH-1/2/MONITOR
: XLR 3P×3
+4 dBu (600 Ω load), low impedance, balanced
(0 dBu=0.775 V rms)

TIME CODE OUT : BNC
2.2 V p-p (600 Ω load), unbalanced

HEADPHONES : Stereo phone jack
−14 dBu max. (8 Ω load)
(0 dBu=0.775 V rms)

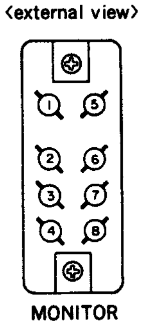
TBC REMOTE



Pin No.	Description	Operating Voltage	IN/OUT
1	SYNC CONTROL	−5 V to +5 V	IN
2	HUE CONTROL	−5 V to +5 V	IN
3	SC CONTROL	−5 V to +5 V	IN
4	VIDEO LEVEL CONTROL	−5 V to +5 V	IN
5	SETUP CONTROL	−5 V to +5 V	IN
6	CHROMA LEVEL CONTROL	−5 V to +5 V	IN
7	−12 V	−12 V	OUT
8	GND	—	IN/OUT
9	FRAME GND	—	IN/OUT
10	N C	—	—
11	N C	—	—
12	N C	—	—
13	Y/C DELAY CONTROL	−5 V to +5 V	IN
14	N C	—	—
15	+12 V	+12 V	OUT

MONITOR

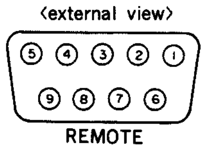
Pin No.	Output Signal
1	AUDIO MONITOR OUT (X)
2	VIDEO OUT (X)
3	—
4	—
5	AUDIO MONITOR OUT (G)
6	VIDEO OUT (G)
7	—
8	—



VIDEO : 1.0 V p-p, 75 Ω, sync negative
Superimposed time code etc. output is specified by sub control panel switches.

AUDIO : −5 dBu (47 kΩ load), unbalanced
(0 dBu=0.775 V rms)

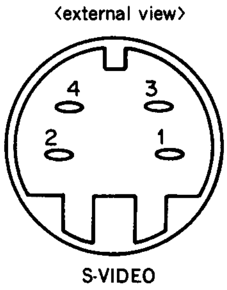
REMOTE



Pin No.	Controlling Device	Controlled Device
1	Frame Ground	Frame Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	—	—
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Frame Ground	Frame Ground

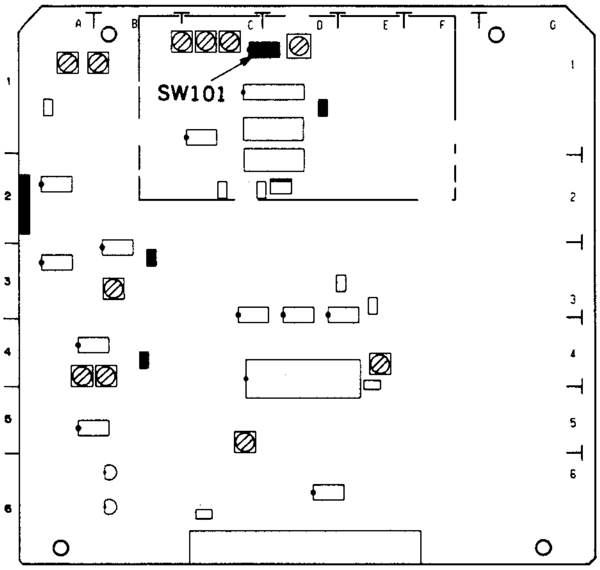
S-VIDEO

Pin No.	Description
1	Y (G)
2	C (G)
3	Y (X)
4	C (X)



1-6. SELECT SWITCH SETTING ON THE BOARD

AU-148 board



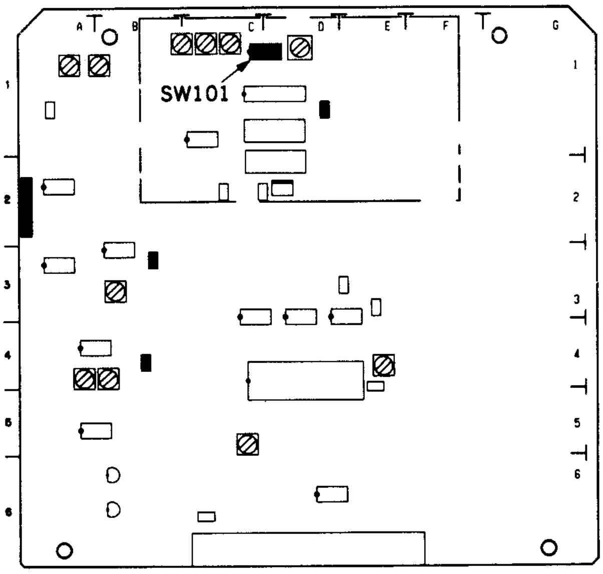
SW101 (C-1/AU-148) : AUDIO HEAD TUNE ADJ SW

Adjust the CH-1 head amp high frequency response (head resonance). (Refer to Section 10-1.)

This switch is used in audio head tune adjustment. If the switch setting is changed when this adjustment is not performed, audio frequency response may be failed.

When the unit is shipped, this switch is set to the position based on the adjustment condition.

AU-149 board



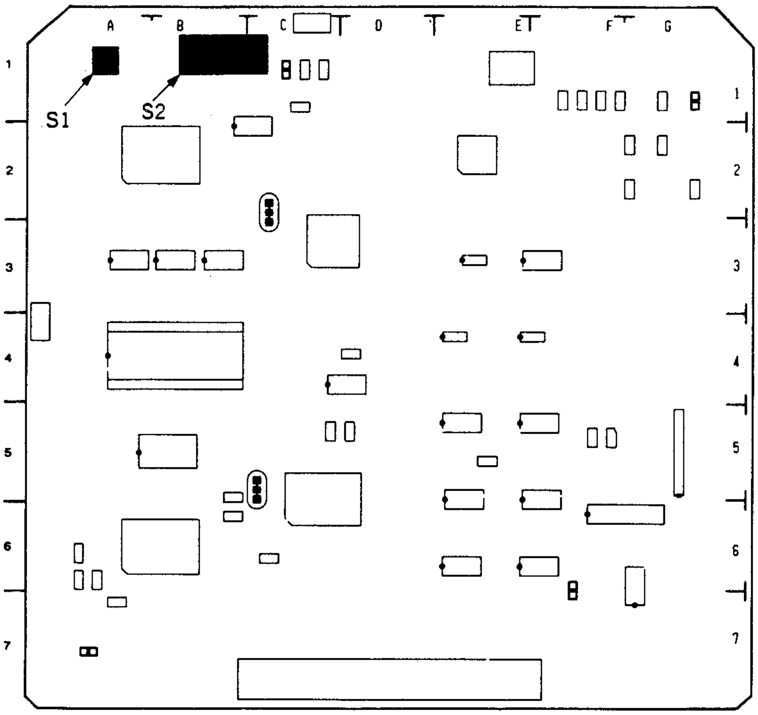
SW101 (C-1/AU-149) : AUDIO HEAD TUNE ADJ SW

Adjust the CH-2 head amp high frequency response (head resonance). (Refer to Section 10-1.)

This switch is used in audio head tune adjustment. If the switch setting is changed when this adjustment is not performed, audio frequency response may be failed.

When the unit is shipped, this switch is set to the position based on the adjustment condition.

DT-30 board



S1 (A-1/DT-30) : DE-DISTORTION

When this switch is pressed, de-distortion is performed.

S2-1 (B-1/DT-30) : WOBBLING DISABLE

Wobbling (DT head is moved so as maximize RF level) is set to ON or OFF by this switch.
When this switch is set to OFF (OPEN), wobbling is set to ON.
When the unit is shipped, this switch is set to OFF (OPEN).

S2-2 (B-1/DT-30) : DT DISABLE 1

Dynamic tracking is set to ON or OFF by this switch.
When this switch is set to ON (CLOSE), dynamic tracking is set to OFF, and voltage is not supplied in all modes without de-distortion mode.
When the unit is shipped, this switch is set to OFF (OPEN).

S2-3 (B-1/DT-30) : DT DISABLE 2

Dynamic tracking is set to ON or OFF by this switch.
When this switch is set to ON (CLOSE), dynamic tracking is set to OFF, and the DT head is fixed to neutral by feed back loop of the strain gauge.
When the unit is shipped, this switch is set to OFF (OPEN).

S2-4 (B-1/DT-30) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S2-5 (B-1/DT-30) : Y/C DELAY SERVO DISABLE

Y/C delay servo (the DT head is operated so as to minimize they Y/C delay) is set to ON or OFF by this switch.
When this switch is set to OFF (OPEN), Y/C delay servo operation is set to ON.
When the unit is shipped, this switch is set to OFF (OPEN).

S2-6 (B-1/DT-30) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

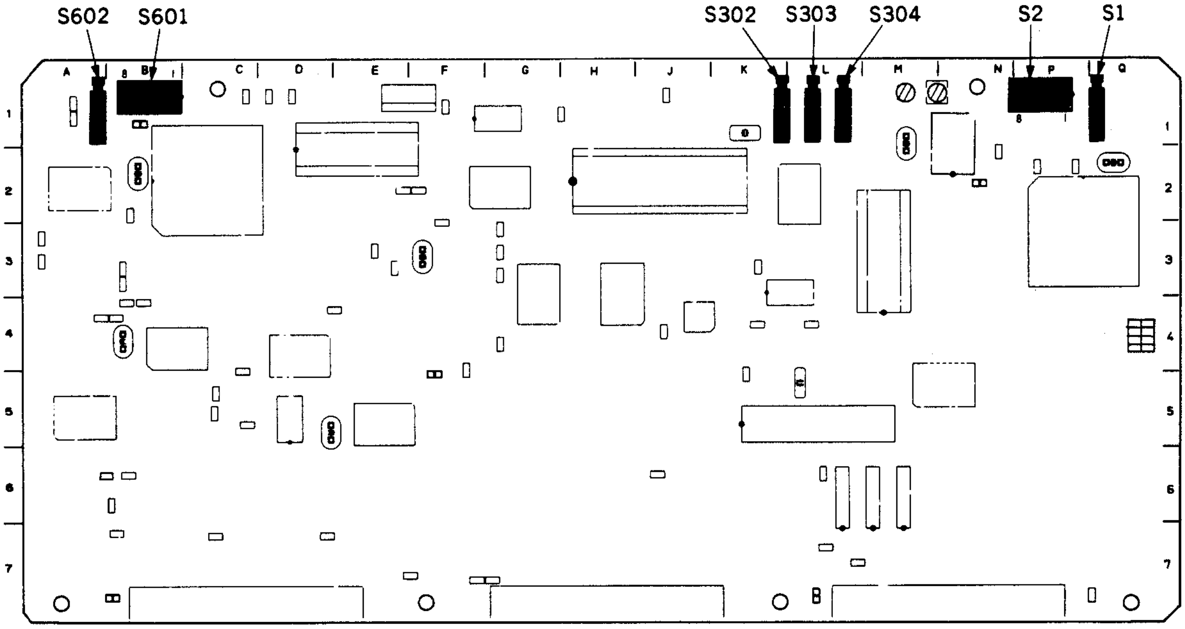
S2-7 (B-1/DT-30) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S2-8 (B-1/DT-30) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

SS-48 board



S1 (Q-1/SS-48): SY/SV RESET SW

When this switch is pressed, systems are initialized as the POWER is turned ON.

S2 (P-1/SS-48): SY DIP SW

- S2-1 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-2 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-3 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-4 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-5 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-6 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-7 (P-1/SS-48): factory use
  When the unit is shipped, this switch is set to OFF (OPEN).
- S2-8 (P-1/SS-48): KEY BOARD SELECT
  This switch should be set to CLOSE.
  When the unit is shipped, this switch is set to ON (CLOSE).

S302 (K-1/SS-48): ADJ (+) SW

When this switch is pressed, the unit is put into the maintenance mode, or execute a menu. (Refer to Section 3 Maintenance Mode.)

S303 (L-1/SS-48): ADJ (−) SW

In the maintenance mode, when this switch is pressed, you can return a menu display or mode display, or finish the maintenance mode. (Refer to Section 3 Maintenance Mode.)

S304 (L-1/SS-48) : Does not use.

S601 (B-1/SS-48) : SV DIP SW

S601-1 (B-1/SS-48) : SERVO ADJUST

Set this switch to ON (CLOSE) when executing the "B110 : RF SWITCHING POS." in the servo system adjustment mode (B1 : SERVO ADJUST) in the maintenance mode.

When the unit is shipped, this switch is set to OFF (OPEN).

S601-2 (B-1/SS-48) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S601-3 (B-1/SS-48) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S601-4 (B-1/SS-48) : SERVO ADJUST

Set this switch to ON (CLOSE), when perform the servo system adjustment mode (B1 : SERVO ADJUST) in the maintenance mode. (Refer to Section 3-3.)

When the unit is shipped, this switch is set to OFF (OPEN).

S601-5 (B-1/SS-48) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S601-6 (B-1/SS-48) : factory use

When the unit is shipped, this switch is set to OFF (OPEN).

S601-7 (B-1/SS-48) : SERVO CHECK

Set this switch to ON (CLOSE) to perform the servo system check mode (B0 : SERVO CHECK) in the maintenance mode. (Refer to Section 3-2.)

When the unit is shipped, this switch is set to OFF (OPEN).

S601-8 (B-1/SS-48) :

This switch is for selecting the initial data.

OPEN : NOVRAM data

CLOSE : ROM data

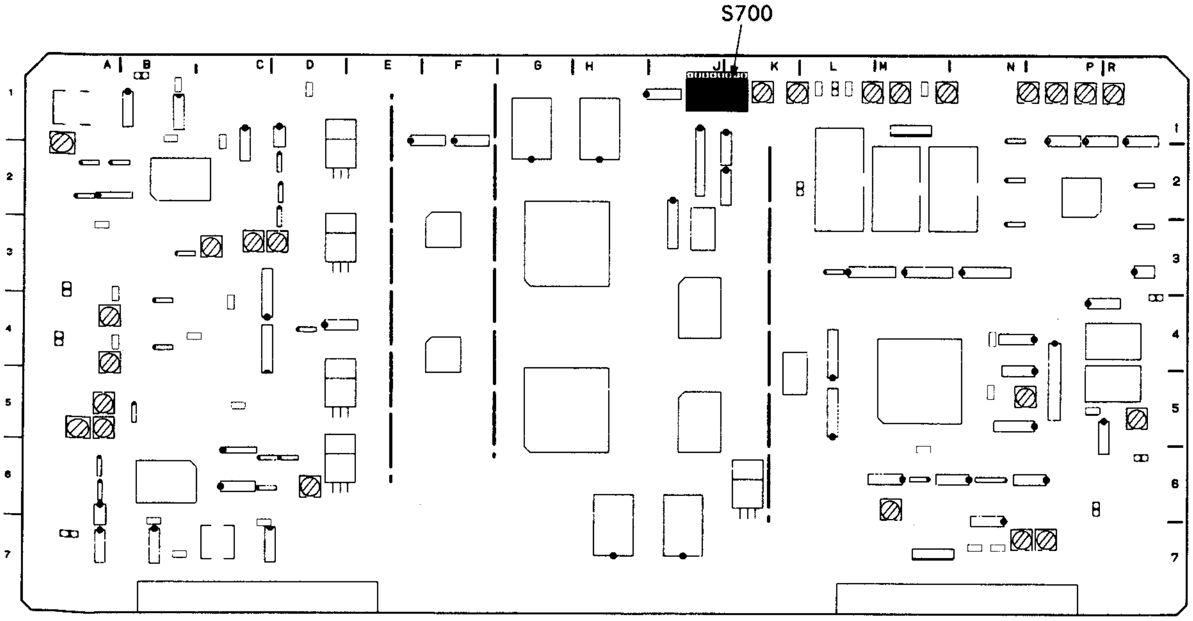
When the unit is shipped, this switch is set to OFF (OPEN).

S602 (A-1/SS-48) : REEL POSITION SELECT SW

When this switch is pressed, reel tables are moved to large or small position forcibly.

The reel tables are moved toggle by pressing the switch.

TBC-18 board



S700-1 (J-1/TBC-18) : LEVEL REF SW

This switch is used for Y/C level adjustment. (Refer to Section 11-2-2 and 11-2-3.)
When this switch is set to ON, reference level signal of internal data are output and D/A, A/D level can be adjusted.
When the adjustment is completed, this switch is surely set to OFF.
When the unit is shipped, this switch is set to OFF.

S700-2 (J-1/TBC-18) : factory use

When the unit is shipped, this switch is set to OFF.

S700-3 (J-1/TBC-18) : Y MUTE SW

This switch is for muting the Y signal of TBC output.
When this switch is set to ON, the Y signal of all video output is muted and is not output.
When the unit is shipped, this switch is set to OFF.

S700-4 (J-1/TBC-18) : C MUTE SW

This switch is for muting the R-Y, B-Y signal of TBC output.
When this switch is set to ON, the R-Y, B-Y signal of COMPONENT 1/2 OUT are muted and are not output. And the chroma signal of COMPOSITE VIDEO OUT is muted, is not output. (The color burst is not muted and is output.)
When the unit is shipped, this swich is set to OFF.

S700-5 (J-1/TBC-18) : COMB SW

The R-Y, B-Y signal of TBC output is filtered by simple comb filter with this switch.
If there is the H step difference which is not-correctable by LCC(Line Crawl Canceller) on the PB video signal, this switch is set to ON.
When this switch is set to ON, this signal is corrected by comb filter.
When this switch is set to OFF, the PB video signal is corrected by LCC only.
When the unit is shipped, this switch is set to OFF.

S700-6 (J-1/TBC-18) : VISC TEST SW

This switch is for VISC phase check and adjustment. (Refer to Section 12-11.)
When this switch is set to ON, the VISC of TBC input is out to TBC output as it is. So this is useful for adjustment and VISC phase check of input signal.
This switch is set to OFF in usual, the regenerated VISC is out to COMPONENT 1/2 OUT.
When the unit is shipped, this switch is set to OFF.

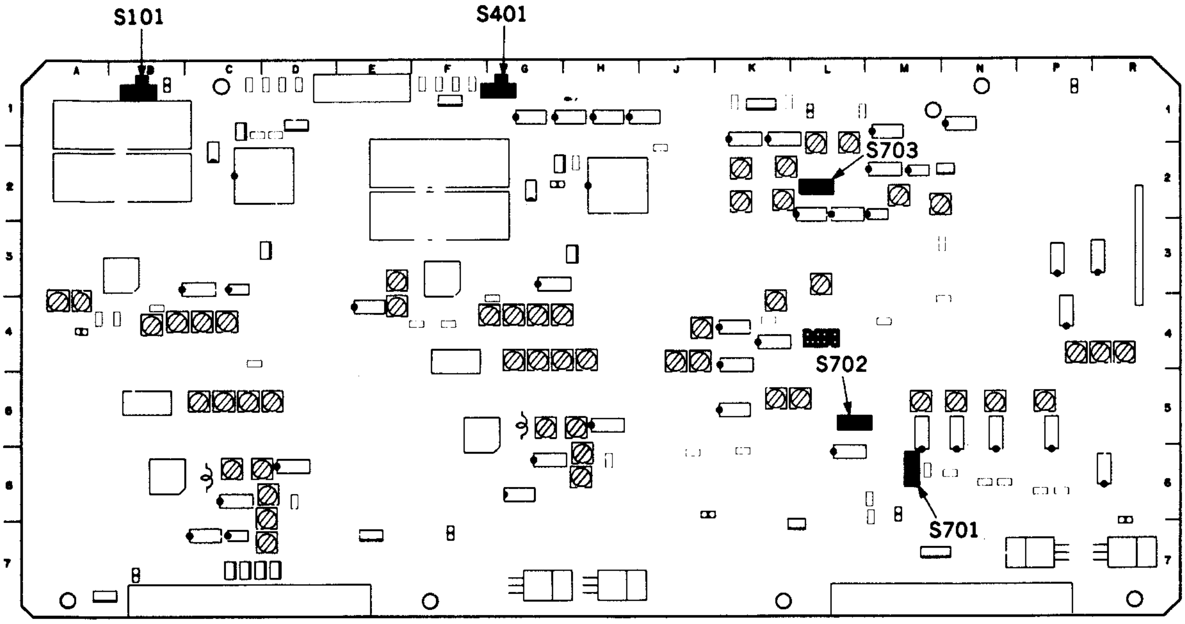
S700-7 (J-1/TBC-18) : factory use

When the unit is shipped, this switch is set to OFF.

S700-8 (J-1/TBC-18) : factory use

When the unit is shipped, this switch is set to OFF.

VP-33 board



S101 (B-1/VP-33): Y RF AGC ON/OFF SW

When this switch is set to OFF, AGC is set to OFF.
This switch is set to ON in usual.
When the unit is shipped, this switch is set to ON.

S401 (G-1/VP-33): C RF AGC ON/OFF SW

When this switch is set to OFF, AGC is set to OFF.
This switch is set to ON in usual.
When the unit is shipped, this switch is set to ON.

S701 (M-6/VP-33): VISC MUTE ON/OFF SW

The VISC which is inserted in the 11th line of COMPONENT Y signal and output to COMPONENT 1/2 OUT is muted or not by this switch.
When the unit is shipped, this switch is set to OFF. (VISC is inserted.)

S702 (L-5/VP-33): ENC CHROMA MUTE SW

The chroma signal of COMPOSITE VIDEO OUT (including color burst) is on or off by this switch. (The signal of COMPONENT OUT is not affected by this switch.)
When the unit is shipped, this switch is set to OFF (color mode).

S703 (L-2/VP-33): CF ID SW

The CF ID inserted in the 15th line of COMPONENT B-Y signal is output or not to COMPONENT 1/2 OUT by this switch.
When the unit is shipped, this switch is set to ON (CF ID is inserted).

1-7. SYSTEM CONTROL SETUP

Various select switches are provided on the control panel, sub control panel, and printed circuit board in the unit. (Refer to Section 1-6 "Select Switch Setting on the Board".)
For the system control items described below, the reference control settings "setup" can be set with menus according to the system.

1-7-1. Setup Menu

The setup menu has Main Menu and System Menu.
The each menu contains the following items.

1. Main Menu

ITEM-000 SERIES : OPERATIONAL KEY PARAMETER

001 : PREROLL TIME
002 : CHARACTER H-POSITION
003 : CHARACTER V-POSITION
005 : DISPLAY INFORMATION SELECT
006 : LOCAL FUNCTION ENABLE
007 : TAPE TIMER DISPLAY
009 : CHARACTER TYPE
010 : CHARACTER H SIZE
011 : CHARACTER V SIZE

2. System Menu

ITEM-100 SERIES : OPERATIONAL PARAMETER

101 : SELECTION FOR SEARCH DIAL ENABLE
102 : MAXIMUM TAPE SPEED
104 : AUDIO MUTING TIME
105 : REF VIDEO MISSING ALARM
106 : CAPSTAN LOCK

ITEM-200 SERIES : INTERFACE OF REMOTE CONTROL

202 : CF FLAG REPLY

ITEM-300 SERIES : EDITING PARAMETER

301 : VAR SPEED RANGE FOR SYNCHRONIZATION
302 : CAPSTAN RE-LOCKING DIRECTION
306 : DMC INITIAL SPEED
307 : AUTO-DELETION FOR INCONSISTENT DATA

ITEM-400 SERIES : PREROLL PARAMETER

401 : FUNCTION MODE AFTER CUE-UP
402 : TIME REFERENCE FOR PREROLL
403 : AUTOMATIC PREROLL REFERENCE ENTRY

ITEM-500 SERIES : TAPE PROTECTION PARAMETER

501 : STILL TIMER
502 : TAPE PROTECTION MODE FROM SEARCH
503 : TAPE PROTECTION MODE FROM STOP
504 : DRUM ROTATION IN STANDBY OFF

ITEM-700 SERIES : VIDEO CONTROL PARAMETER

703 : BLANK LINE SELECT

ITEM-900 SERIES : ADJUSTMENT USE ONLY (FACTORY USE PARAMETER)

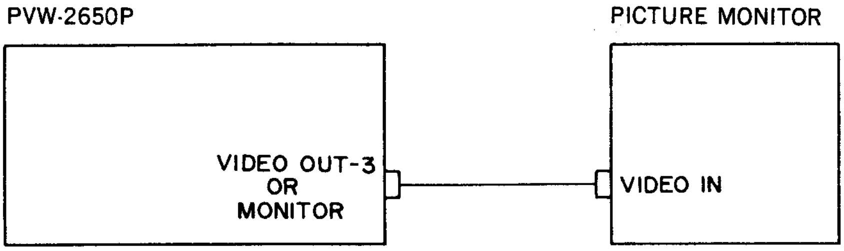
901 : AUDIO NR IN SP MODE
902 : EMERGENCY TAPE PROTECTION
913 : TRACKING CONTROL VIA SEARCH DIAL

1-7-2. Setup Operation

The setup conditions appears in the time counter on the control panel and picture monitor.

The time counter display indicates the item number, and data number only.

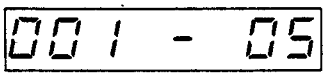
The informations about the item and data can be superimposed on the picture monitor connected to the VIDEO OUTPUT 3 connector or MONITOR connector on the connector panel of the unit. However the CHARACTER switch on the sub control panel must be set to ON.



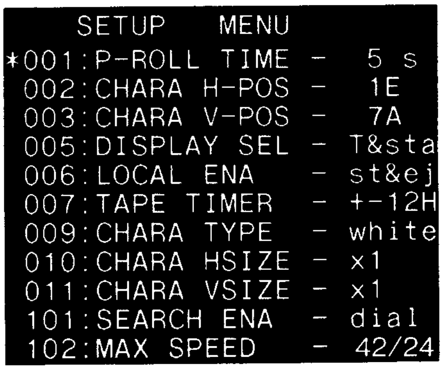
1. Put the unit into setup menu mode.

Press the SYSTEM SET-UP MENU button on the sub control panel.

time counter display



monitor display



```
   SETUP   MENU
*001:P-ROLL TIME  -   5 s
 002:CHARA H-POS  -   1E
 003:CHARA V-POS  -   7A
 005:DISPLAY SEL  - T&sta
 006:LOCAL ENA    - st&ej
 007:TAPE TIMER   - +-12H
 009:CHARA TYPE   - white
 010:CHARA HSIZE  - x1
 011:CHARA VSIZE  - x1
 101:SEARCH ENA   - dial
 102:MAX SPEED    - 42/24
```

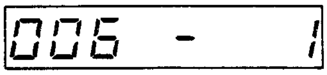
2. Select the item.

Push the search dial, and the unit enters the JOG mode.

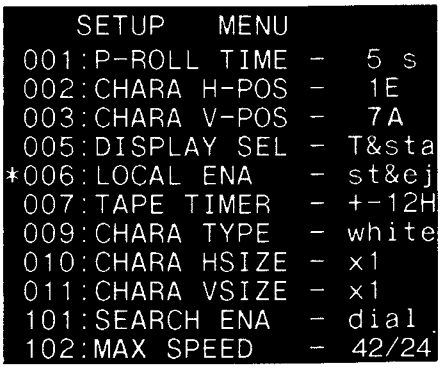
Rotate the search dial on the control panel.

Rotate the dial clockwise to display higher-numbered items, and counterclockwise to display lower-numbered items.

time counter display



monitor display

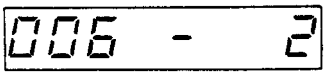


```
   SETUP   MENU
 001:P-ROLL TIME  -   5 s
 002:CHARA H-POS  -   1E
 003:CHARA V-POS  -   7A
 005:DISPLAY SEL  - T&sta
*006:LOCAL ENA    - st&ej
 007:TAPE TIMER   - +-12H
 009:CHARA TYPE   - white
 010:CHARA HSIZE  - x1
 011:CHARA VSIZE  - x1
 101:SEARCH ENA   - dial
 102:MAX SPEED    - 42/24
```

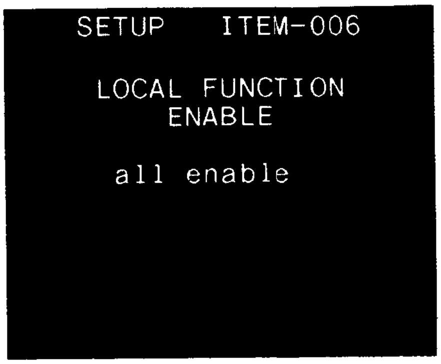
3. Change the data.

Pressing the SEARCH button, rotate the search dial.
Rotate the dial clockwise to display higher-numbered data, and counterclockwise to display lower-numbered data.
After changing the data, release the SEARCH button to select the data.

time counter display



monitor display



SETUP ITEM-006

LOCAL FUNCTION
ENABLE

all enable

This is displayed during pressing the SEARCH button.

Repeat Step 2 and 3 until you are satisfied with the settings of all menu items.

When changes are cancelled and restored to the former settings, press the SYSTEM SET-UP MENU button.

4. Save the data, and finish the setup menu mode.

Press the SET button on the sub control panel.

- The setup data are saved to a nonvolatile memory (NV-RAM) and remains even if the POWER switch is turned off.

Restoring the factory settings

If it is wishing to be restored all data to the factory setting, press the MENU button of the SYSTEM-UP on the sub control panel and press the RESET button at the upper right of the time counter.

1-7-3. Main Menu

The numbers enclosed with $\boxed{\quad}$ in the data column indicate the factory preset settings.

ITEM-000 SERIES : OPERATIONAL KEY PARAMETER

ITEM		DATA		Description
No.	ITEM	No.	DATA	
001	**PREROLL TIME**	00 01 02 03 04 $\boxed{05}$ 06 07 08 09 10 11 12 13 14 15	0 sec 1 sec 2 sec 3 sec 4 sec $\boxed{\text{5 sec}}$ 6 sec 7 sec 8 sec 9 sec 10 sec 11 sec 12 sec 13 sec 14 sec 15 sec	Set the preroll time to between 0 and 15 seconds in steps of 1 second. A preroll time of at least 3 seconds is recommended when using this unit for editing.
002	**CHARACTER H-POSITION**	00 〜 $\boxed{1E}$ 〜 57		Adjust the horizontal position of the characters superimposed on the signal output from the VIDEO OUTPUT 3 connector or MONITOR connector. The hexadecimal value "00" is for the far left of the screen and "57" (decimal 87) for the far right. Increasing the value moves the position of the characters to the right. It is possible to place the character to 88 positions.
003	**CHARACTER V-POSITION**	00 〜 $\boxed{7A}$ 〜 94		Adjust the vertical position of the characters superimposed on the signal output from the VIDEO OUTPUT 3 connector or MONITOR connector. The hexadecimal value "00" is for the top of the screen and "94" (decimal 148) for the bottom. Increasing the value lowers the position of the screen. It is possible to place the character to 149 positions.
005	**DISPLAY INFORMATION SELECT**	$\boxed{0}$ 1 2 3 4	$\boxed{\text{time data \& status}}$ time data & UB time data & CTL time data & time data time data only	Determines the data output from the VIDEO OUTPUT 3 connector or MONITOR connector when the CHARACTER ON/OFF switch on the sub control panel to ON. **0 :** Timer information and VTR status. **1 :** Timer information and users bit. **2 :** Timer information and CTL. **3 :** Timer information (LTC and VITC). **4 :** Timer information only (LTC or VITC).

ITEM		DATA		Description
No.	ITEM	No.	DATA	
006	**LOCAL FUNCTION ENABLE**	0 $\boxed{1}$ 2	all disable $\boxed{\text{stop \& eject}}$ all enable	Determines which buttons on the control panel are enabled, when the unit is set to the REMOTE mode. **0 :** All of the switches/buttons are disabled. **1 :** Only the STOP and EJECT buttons are enabled. **2 :** All of the switches/buttons are enabled.
007	**TAPE TIMER DISPLAY**	$\boxed{0}$ 1	$\boxed{+/-12\text{H}}$ 24H	Determines whether the CTL counter should display 12-hour or 24-hour time. **0 :** 12-hour time. **1 :** 24-hour time.
009	**CHARACTER TYPE**	$\boxed{0}$ 1 2 3		Determines the type of superimposed characters output from the VIDEO OUTPUT 3 connector or MONITOR connector. **0 :** White letters on a black background. **1 :** Black letters on a white background. **2 :** Black outline letters. **3 :** White outline letters.
010	**CHARACTER H SIZE**	$\boxed{01}$ 02		Determines the horizontal size of superimposed characters output from the VIDEO OUTPUT 3 connector or MONITOR connector. **01 :** Standard **02 :** Twice standard size
011	**CHARACTER V SIZE**	$\boxed{01}$ 02 03 04		Determines the vertical size of superimposed characters output from the VIDEO OUTPUT 3 connector or MONITOR connector. **01 :** Standard size **02 :** Twice standard size **03 :** 3 times standard size **04 :** 4 times standard size

1-7-4. System Menu

The numbers enclosed with $\boxed{\quad}$ in the data column indicate the factory preset settings.

ITEM-100 SERIES : OPERATIONAL PARAMETER

ITEM		DATA		Description
No.	ITEM	No.	DATA	
101	**SELECTION FOR SEARCH DIAL ENABLE**	$\boxed{0}$ 1	$\boxed{\text{dial direct}}$ via search key	Determines when the unit is put into search mode. **0**: When the search dial is rotated, the unit is put into the search mode from any mode. **1**: When the SEARCH button is pressed, the unit is put into the search mode.
102	**MAXIMUM TAPE SPEED**	0 $\boxed{1}$ 2	X42 $\boxed{\text{X42 (shuttle X24)}}$ X24	Sets the maximum tape speed for fast forward and rewind, and the maximum tape speed selectable with the search dial. **0**: 42 times normal speed. **1**: 42 times normal speed for fast forward and rewind, and 24 times normal speed for the search dial in shuttle mode. **2**: 24 times normal speed.
104	**AUDIO MUTING TIME**	$\boxed{00}$ 01 02 03 04 05 06 07 08 09 10	$\boxed{\text{OFF}}$ 0.1 sec 0.2 sec 0.3 sec 0.4 sec 0.5 sec 0.6 sec 0.7 sec 0.8 sec 0.9 sec 1.0 sec	Determines the muting time of an audio signal when the unit enters the playback mode from stop or still mode to playback mode. Can be set to any value between 0 and 1.0 second, in steps of 0.1 second.
105	**REF VIDEO MISSING ALARM**	$\boxed{0}$ 1	$\boxed{\text{off}}$ on	Issue warning if reference video signals are not being supplied through the REF.VIDEO connector. **0**: Does not issue warning. **1**: Warns by flashing the STOP button.
106	**CAPSTAN LOCK**	$\boxed{0}$ 1 2 3 4	$\boxed{\text{switch select}}$ 2F 2F/4F 4F 8F	Selects the capstan servo lock mode. **0**: Use the setting of the CAPSTAN LOCK switch on the sub control panel. **1**: Always 2F, regardless of CAPSTAN LOCK switch setting on the sub control panel. **2**: Always 2F/4F, regardless of CAPSTAN LOCK switch setting on the sub control panel. **3**: Always 4F, regardless of CAPSTAN LOCK switch setting on the sub control panel. **4**: Always 8F, regardless of CAPSTAN LOCK switch setting on the sub control panel.

ITEM-200 SERIES : INTERFACE OF REMOTE CONTROL

ITEM		DATA		Description
No.	ITEM	No.	DATA	
202	**CF FLAG REPLY**	$\boxed{0}$ 1	$\boxed{\text{8F}}$ 4/8F	Determines the status of color frame which is sent to remote controller. **0 :** 8FD **1 :** 4/8FD

ITEM-300 SERIES : EDITING PARAMETER

(Items concerning operational settings when you use this unit as a player in an editing system.)

ITEM		DATA		Description
No.	ITEM	No.	DATA	
301	**VAR SPEED RANGE FOR SYNCHRONIZATION**	$\boxed{0}$ 1	$\boxed{-1\sim+3}$ $-1.15\sim+3.45$	Set the limit of speed, when it is controlled variable by remote control unit which is connected to remote connector (9pin). **0 :** Limit of speed is from −1 to +3. **1 :** Limit of speed is from −1.15 to +3.45. NOTE : Set the DATA NO. to "1" when this unit is connected with editing controller (BVE-910) and DT editing is performed. When DATA NO. is selected to "1", if DT playback is performed at excess speed of −1 to +3, it may happen to picturemissing on the lower the monitor picture. But it is not breakdown.
302	**CAPSTAN RE-LOCKING DIRECTION**	0 $\boxed{1}$	deceleration $\boxed{\text{acceleration}}$	Determines whether capstan servo lock mode is deceleration mode or acceleration mode, when the CAPSTAN LOCK switch on the sub control panel is set to 4FD. **0 :** Capstan servo locks in deceleration mode. **1 :** Capstan servo locks in acceleration mode.
306	**DMC INITIAL SPEED**	$\boxed{00}$ 01 02 03 04 05 06 07 08 09 10 11 12 13	$\boxed{\text{manual}}$ play still +0.03 +0.1 +0.2 +0.5 +1 +2 −0.03 −0.1 −0.2 −0.5 −1	In Dynamic Motion Control editing, determines the initial speed which is set automatically. **00 :** Determined the initial speed by rotation angle of the search dial. **01 :** Nomal playback speed. **02 :** Tape is stopped. **03 through 13 :** The initial speed is a speed in the search mode.

ITEM		DATA		Description
No.	ITEM	No.	DATA	
307	**AUTO-DELETION FOR INCONSISTENT DATA**	$\boxed{0}$ 1 2	$\boxed{\text{manual}}$ neg & excess neg	Determines the mode what happens when an erroneous edit point, such as an OUT point located before an IN point, or excessive edit points are set. **0 :** Issue a warning by flashing the DELETE indicator on the recorder (PVW-2800P). The operator must manually delete the excessive unnecessary edit points or correct the erroneous edit point. **1 :** When a incorrect edit point is set, the previously set edit point is deleted automatically. When excessive edit points are set, the previously set edit point is deleted automatically. **2 :** When a incorrect edit point is set, the previously set edit point is deleted automatically. When excessive edit points are set, the DELETE indicator on the recorder (PVW-2800P) flashes to issue a warning. NOTE : Delete edit points by pressing the DELETE button simultaneously with one of the IN/OUT or AUDIO IN/OUT buttons. (These buttons are on the recorder (PVW-2800P)) Edits cannot be executed if the DELETE indicator on the recorder (PVW-2800P) is flashing.

ITEM-400 SERIES : PREROLL PARAMETER

(Items concering operational settings when you use this unit as a player in an editing system.)

ITEM		DATA		Description
No.	ITEM	No.	DATA	
401	**FUNCTION MODE AFTER CUE-UP**	$\boxed{0}$ 1	$\boxed{\text{stop}}$ still	Determines the unit's mode after cue-up. **0 :** Stop mode. **1 :** Still mode. (Search mode.)
402	**TIME REFERENCE FOR PREROLL**	$\boxed{0}$ 1	$\boxed{\text{CTL}}$ TC	When a tape with the time code signal containing a discontinuous point is used and discontinuous point is prerolled, determines whether the time code signal preceeding the point is advanced and prerolled using a CTL signal. **0 :** Interpolate with a CTL signal. **1 :** Does not interpolate with a CTL signal. NOTE: When "0" is selected, maximum tape speed during cue-up or preroll is limited to 10 times normal speed.
403	**AUTOMATIC PREROLL REFERENCE ENTRY**	$\boxed{0}$ 1	$\boxed{\text{disable}}$ enable	Determines whether the IN point is entered by pressing only the PREROLL button on the recorder (PVW-2800P) when it is not entered during preroll operation. **0 :** Does not enter the IN point automatically. **1 :** Enters the IN point automatically.

ITEM-500 SERIES : TAPE PROTECTION PARAMETER

ITEM		DATA		Description
No.	ITEM	No.	DATA	
501	**STILL TIMER**	00	0.5 sec	If the unit remains in stop or still mode for a certain period of time, it is put automatically into tape protection mode in order to prevent from head clogging and tape damage. This item determines the transition time of the tape stop to tape protection mode. The time may set to one of the 16 values, ranging between 0.5 second to 30 minutes.
		01	5 sec	
		02	10 sec	
		03	20 sec	
		04	30 sec	
		05	40 sec	
		06	50 sec	
		07	1 min	
		08	2 min	
		09	3 min	
		10	4 min	
		11	5 min	
		12	6 min	
		13	7 min	
		$\boxed{14}$	$\boxed{\text{8 min}}$	
		15	30 min	
502	**TAPE PROTECTION MODE FROM SEARCH**	$\boxed{0}$	$\boxed{\text{step fwd}}$	When the time in the still mode during search mode (JOG/SHUTTLE) set using Item 501 passes, the unit enters the tape protection mode. This item determines the tape protection mode setting. **0 :** When the time designated by Item 501 passes, the tape is sent repeatedly for 2 seconds at 1/30 times normal speed in the forward direction. **1 :** When the designated time passes, the unit enters the standby off mode. **2 :** When the designated time passes, the unit enters the tension release mode.
		1	standby off	
		2	tension release	
503	**TAPE PROTECTION MODE FROM STOP**	$\boxed{0}$	$\boxed{\text{standby off}}$	When the time in the stop mode set using Item 501 passes, the unit enters the tape protection mode. This item determines the tape protection mode setting. **0 :** When the designated time passes, the unit enters the standby off mode. **1 :** When the designated time passes, the unit enters the tension release mode.
		1	tension release	
504	**DRUM ROTATION IN STANDBY OFF**	$\boxed{0}$	$\boxed{\text{off}}$	Determines whether the head drum stops rotating in standby OFF mode. **0 :** Drum stops rotating. **1 :** Drum keeps rotating.
		1	on	

ITEM-700 SERIES : VIDEO CONTROL PARAMETER

* To choose line for setup menu "Item 703", rotate the search dial while pressing the STOP button on the control panel.

ITEM		DATA		Description
No.	ITEM	No.	DATA	
703*	**BLANK LINE SELECT**	9,322 ≀ 22,335 line		Determines blanking lines for the V-blanking period of output video signals. Each of the lines from 9,322 to 23,336 may be set ON or OFF separately. **0**: Blanking ON **1**: Half blanking at line 23,336. **2**: Blanking OFF
		$\boxed{0}$	$\boxed{\text{blank}}$	
		2	throu	
		23,336 line		
		$\boxed{1}$	$\boxed{\text{half}}$	
		2	throu	

ITEM-900 SERIES : ADJUSTMENT USE ONLY (FACTORY USE PARAMETER)

The items below are not displayed on the normal operation to avoid the erroneous operation.
To display "Item 901" or "Item 902", turn the SEARCH dial while pressing the PLAY button in setup memu mode.
The two items are used exclusively for adjustment. After adjustment is completed, the menu data should be returned to the factory setting.

ITEM		DATA		Description
No.	ITEM	No.	DATA	
901	**AUDIO NR IN SP MODE**	$\boxed{0}$ 1	$\boxed{\text{on}}$ switch select	This item is used exclusively for audio system adjustment. After adjustment is completed, be sure to return the menu data to the factory setting "0". The Dolby NR control is selected when a metal particle tape is used for recording and playback. **0 :** Turned ON at all times when the metal particle tape is used. **1 :** Turned ON or OFF using the DOLBY NR switch on the sub control panel. NOTE: When an oxide tape is used, set using the DOLBY NR switch on the sub control panel irrespective of this setting.
902	**EMERGENCY TAPE PROTECTION**	$\boxed{0}$ 1	$\boxed{\text{enable}}$ disable	This item is used exclusively for servo system and mechanical adjustments. After adjustment is completed, be sure to return the menu data to the factory setting "0". When the unit detects an error in the tape transport system, selects whether tape protection is done or not. **0 :** Tape protection is done. **1 :** Tape protection is not done. NOTE: When "1" is selected, the AUTO OFF lamp blinks.
913	**TRACKING CONTROL VIA SEARCH DIAL**	$\boxed{0}$ 1	$\boxed{\text{off}}$ on	This item is used exclusively for servo system adjustment. After adjustment is completed, be sure to return the menu data to factory setting "0". Selected whether servo tracking control is perfomed or not with the search dial. **0 :** Tracking control is not done with the search dial. **1 :** Tracking control is performed by rotating the search dial in the play mode. NOTE : When "1" is selected, it is not entered search mode by rotating the search dial. If it is wished to be entered search mode, use the search button.

1-8. RACK MOUNTING

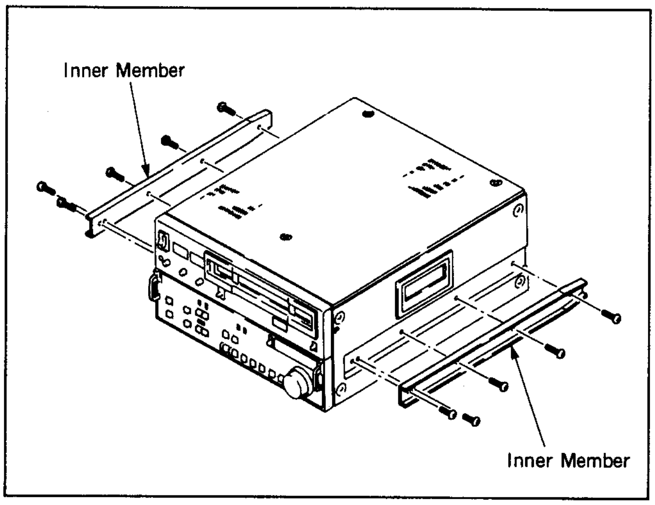
The unit can be mounted in a 19-inch standard rack.
It is recommended to use the following kit.

Rack Mount Kit : RMM-110 (optional accessory)
or
RACK-MOUNT SLIDES : MODEL 305
slide length 558.8 mm
(ACCURIDE)

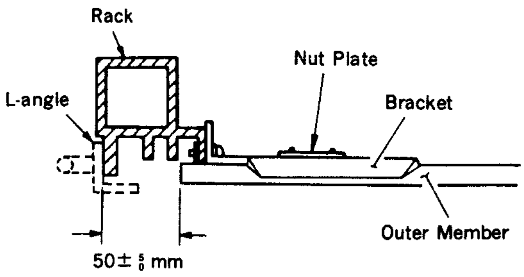
Note for rack mounting :

- When several units are mounted in a rack, it is recommended to install a fan for ventilation. Good air circulation is essential to prevent internal heat build-up in a rack (5 °C to 40 °C must be met for all units).
- Never remove a upper panel and lower panel during rack mounting.
- Be sure to secure the rack to the floor to avoid accidents when a unit is pulled out.

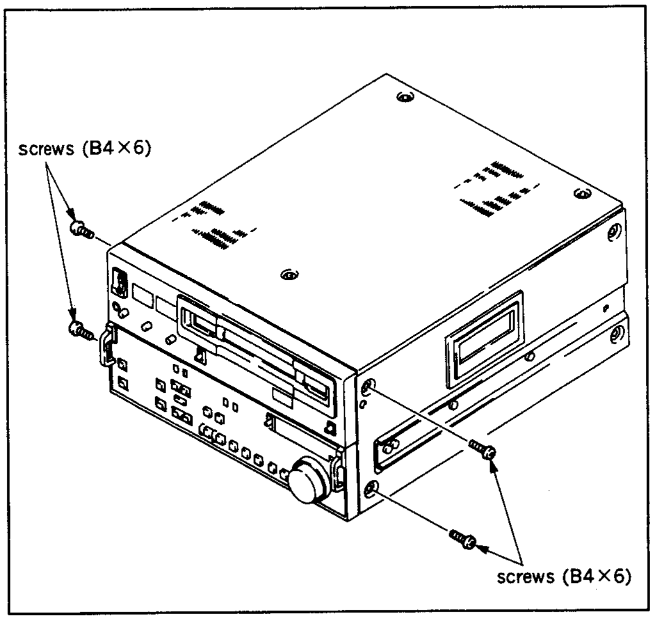
1. Remove the five screws on right and left side panels. And install the Inner Members of the rails to the right and left side panels with the screws removed.



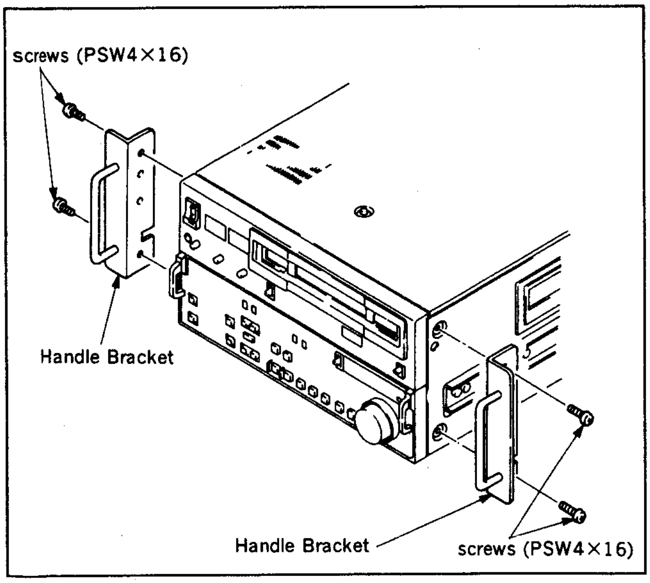
2. Remove the four feet on the lower panel. If the unit is mounted in the rack with the feet attached, they will contact the lower and the upper portions of the rack and the unit cannot be pulled out from the rack.
3. Install the Outer Member Bracket of the slide rail to the rack. Adjust the distance from the edge of the slide rail to the outside of the rack so that it meets the required specification.



4. Remove the two screws(B4×6) on the right and left side panels. (Be careful not to lose these four screws.)



5. Install the Handle Brackets to the holes described in step (4) with the supplied screws (PSW4×16) for these brackets.



(NOTE) Never use screws PSW4×16 to install the right and left side panels. Be sure to install the panels with the screws B4×6 removed in step 4. Screws for Handle Brackets are longer than the ones of side panels. Therefore, using the screws PSW4×16 may cause trouble in the unit.

1-9. SUPPLIED ACCESSORIES

- AC power code (1)
- 9-pin remote cable RCC-5G (1)
- PSW4×16 screws for rack mounting (4)
- Operation manual (1)

1-10. OPTIONAL ACCESSORIES

- U-matic dubbing output kit: BKW-2030
- Control panel extension kit: BKW-2010
- Control panel case: BK-803
- TBC remote control unit: BK-2006
  BVR-50P
- Rack mount kit: RMM-110
  This kit is used to mount the unit in a standard 19-inch rack.
- 12-pin dubbing cable: VDC-C5
- 7-pin dubbing cable: VDC-5
- Cleaning cassette tape: BCT-5CLN

1-11. SETTING CHECK SHEET

It is recommended to check the setup conditions such as switch, setup menu under the application.
And it is recommended to copy this sheet and write down and keep, when maintenance or changing the use condition.
If the unit is used in editing room, changing the system combination very often, several sheet based on the combination is useful.
This is to help the trouble during editing such as setting.

CONTROL PANEL

AUDIO MONITOR	☐ CH1 ☐ MIX ☐ CH2
LOCAL/REMOTE	☐ LOCAL ☐ REMOTE
CH1 PB VOL	☐ MANUAL ☐ AUTO
CH2 PB VOL	☐ MANUAL ☐ AUTO
CTL/TC/U-BIT	☐ CTL ☐ TC ☐ U-BIT

SUB CONTROL PANEL

DOLBY NR	☐ ON ☐ OFF
CHARACTER	☐ ON ☐ OFF
TC	☐ LTC ☐ AUTO ☐ VITC
CAPSTAN LOCK	☐ 2FD ☐ 2/4FD ☐ 4FD ☐ 8FD
TBC CONTROL	☐ REMOTE ☐ LOCAL
VIDEO	☐ PRESET ☐ MANUAL
CHROMA	☐ PRESET ☐ MANUAL
SET UP	☐ PRESET ☐ MANUAL
Y/C DELAY	☐ PRESET ☐ MANUAL

CONNECTOR PANEL

REF. VIDEO 75 Ω	☐ ON ☐ OFF

SETUP MENU

ITEM	factory setting	setting
001 PREROLL TIME	05	
002 CHARACTER H-POSITION	1E	
003 CHARACTER V-POSITION	7A	
005 DISPLAY INFORMATION SELECT	0	
006 LOCAL FUNCTION ENABLE	1	
007 TAPE TIMER DISPLAY	0	
009 CHARACTER TYPE	0	
010 CHARACTER H SIZE	01	
011 CHARACTER V SIZE	01	
101 SELECTION FOR SEARCH DIAL ENABLE	0	
102 MAXIMUM TAPE SPEED	1	
104 AUDIO MUTING TIME	00	
105 REF VIDEO MISSING ALARM	0	
106 CAPSTAN LOCK	0	
202 CF FLAG REPLY	0	
301 VAR SPEED RANGE FOR SYNCHRONIZATION	0	
302 CAPSTAN RE-LOCKING DIRECTION	1	
306 DMC INITIAL SPEED	00	
307 AUTO-DELETION FOR INCONSISTENT DATA	0	
401 FUNCTION MODE AFTER CUE-UP	0	
402 TIME REFERENCE FOR PREROLL	0	
403 AUTOMATIC PREROLL REFERENCE ENTRY	0	

ITEM		factory setting	setting
501 STILL TIMER		14	
502 TAPE PROTECTION MODE FROM SEARCH		0	
503 TAPE PROTECTION MODE FROM STOP		0	
504 DRUM ROTATION IN STANDBY OFF		0	
703 BLANK LINE SELECT	9,322	0	
	10,323		
	11,324		
	12,325		
	13,326		
	14,327		
	15,328		
	16,329		
	17,330		
	18,331		
	19,332		
	20,333		
	21,334		
	22,335		
	23,336	1	
901 AUDIO NR IN SP MODE		0	
902 EMERGENCY TAPE PROTECTION		0	
913 TRACKING CONTROL VIA SEARCH DIAL		0	

SWITCH ON BOARD

board	switch	factory setting	setting
AU-148 board	SW101 AUDIO HEAD TUNE ADJ SW (CH-1)	Dependent on adjustment	
AU-149 board	SW101 AUDIO HEAD TUNE ADJ SW (CH-2)	Dependent on adjustment	
DT-30 board	S2-1 WOBBLING DISABLE	OFF (OPEN)	
	S2-2 DT DISABLE 1	OFF (OPEN)	
	S2-3 DT DISABLE 2	OFF (OPEN)	
	S2-4 factory use	OFF (OPEN)	
	S2-5 Y/C DELAY SERVO DISABLE	OFF (OPEN)	
	S2-6 factory use	OFF (OPEN)	
	S2-7 factory use	OFF (OPEN)	
	S2-8 factory use	OFF (OPEN)	
SS-48 board	S2-1 factory use	OFF (OPEN)	
	S2-2 factory use	OFF (OPEN)	
	S2-3 factory use	OFF (OPEN)	
	S2-4 factory use	OFF (OPEN)	
	S2-5 factory use	OFF (OPEN)	
	S2-6 factory use	OFF (OPEN)	
	S2-7 factory use	OFF (OPEN)	
	S2-8 KEY BOARD SELECT	ON (CLOSE)	
	S601-1 SERVO ADJUST	OFF (OPEN)	
	S601-2 factory use	OFF (OPEN)	
	S601-3 factory use	OFF (OPEN)	
	S601-4 SERVO ADJUST	OFF (OPEN)	
	S601-5 factory use	OFF (OPEN)	
	S601-6 factory use	OFF (OPEN)	
	S601-7 SERVO CHECK	OFF (OPEN)	
	S601-8 NOVRAM/ROM DATA SELECT SW	OFF (OPEN)	

board	switch	factory setting	setting
TBC-18 board	S700-1 LEVEL REF SW	OFF	
	S700-2 factory use	OFF	
	S700-3 Y MUTE SW	OFF	
	S700-4 C MUTE SW	OFF	
	S700-5 COMB SW	OFF	
	S700-6 VISC TEST SW	OFF	
	S700-7 factory use	OFF	
	S700-8 factory use	OFF	
VP-33 board	S101 Y RF AGC ON/OFF SW	ON	
	S401 C RF AGC ON/OFF SW	ON	
	S701 VISC MUTE ON/OFF SW	OFF	
	S702 ENC CHROMA MUTE SW	OFF	
	S703 CF ID SW	ON	

SECTION 2
SERVICE INFORMATION

2-1. SPECIFICATIONS

GENERAL

Power requirements : 220-240 V ac, 50/60 Hz
Operating voltage : 90-264 V
Power consumption : 130 W
Operating temperature : +5 °C to +40 °C
Storage temperature : −20 °C to +60 °C
Humidity : 80% or less
Weight : 24.5 kg
Dimensions : 427×237×520 mm (w/h/d, excluding the projections)
Normal tape speed : 101.51 mm/s
Maximum playback time : 100 min or longer with BCT-90ML cassette
Fast forward/rewind time : 180 s or less with BCT-90ML cassette
Search speed
Shuttle mode : Still, 0.03, 0.1, 0.2, 0.5, 1, 3, 5, 10, 24 and * 42 times normal speed, forward and reverse.
* 42 times ; by setting in setup menu ITEM-102.
Jog mode : Variable from still to normal speed, forward and reverse.
Recommended cassette tape : 1/2-inch Betacam or Betacam SP cassette
Metal tapes : BCT-5M/10M/20M/30M/
BCT-5ML/10ML/20ML/30ML/60ML/90ML or equivalent
Oxide tapes : BCT-5G/10G/20G/30G/
BCT-5GL/10GL/20GL/30GL/60GL/90GL or equivalent

Video

(recording)/playback Luminance FM
Chrominance FM (Compressed time division multiplexed)

		Metal tape	**Oxide tape**
Band width	Luminance	25 Hz to 5.5 MHz $^{+0.5}_{-4.0}$ dB	25 Hz to 4.0 MHz $^{+0.5}_{-6.0}$ dB
	Color difference	R-Y : 25 Hz to 2.0 MHz $^{+0.5}_{-3.0}$ dB B-Y : 25 Hz to 2.0 MHz $^{+0.5}_{-3.0}$ dB	R-Y : 25 Hz to 1.5 MHz $^{+0.5}_{-3.0}$ dB B-Y : 25 Hz to 1.5 MHz $^{+0.5}_{-3.0}$ dB
S/N	Luminance (component)	48 dB or greater	46 dB or greater
	Chrominance	AM : 48 dB or greater PM : 48 dB or greater	AM : 48 dB or greater PM : 48 dB or greater
K-factor (2T pulse)		2 % or less	3 % or less
DG		3 % or less	3 % or less
DP		3° or less	3° or less
Y/C delay		20 ns or less	

*When play back a standard tape.

Audio

(Audio recording) AC Bias

	Metal tape	Oxide tape
Frequency response	50 Hz to 15 kHz ${}^{+1.5}_{-3.0}$ dB	50 Hz to 15 kHz ±3.0 dB
Signal to noise ratio (at peak level*, weighted CCIR468-3)	68 dB or greater (with dolby NR)	62 dB or greater (with dolby NR)
Distortion factor (THD) (Reference level, 1 kHz)	1% or less	2% or less
Wow & flutter	0.1% rms or less	

* Peak level : +8 dB above the operation level

Processor adjustment range

Video level : ± 3 dB
Chroma level : ± 3 dB
Setup level : 0–100 mV
System SC phase : 360° p-p
System sync phase : ${}^{+3}_{-1}$ μs
Y/C delay : ± 50 ns

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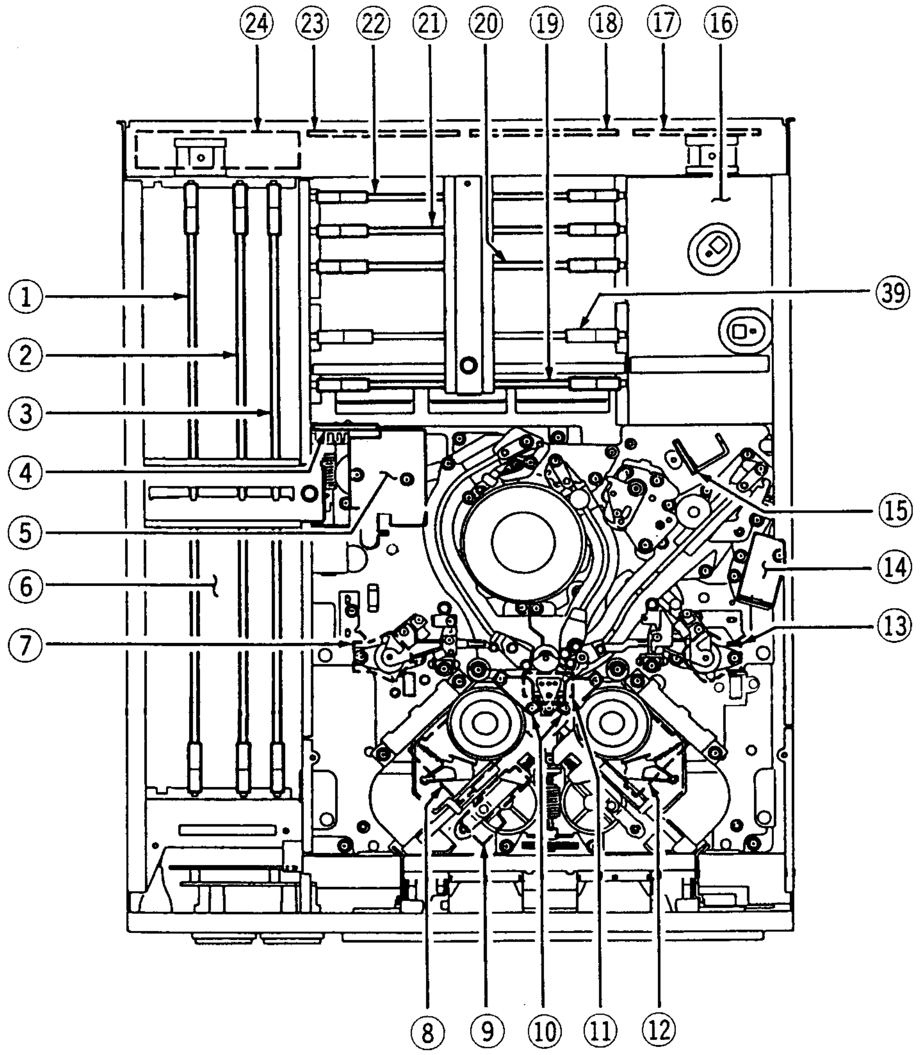
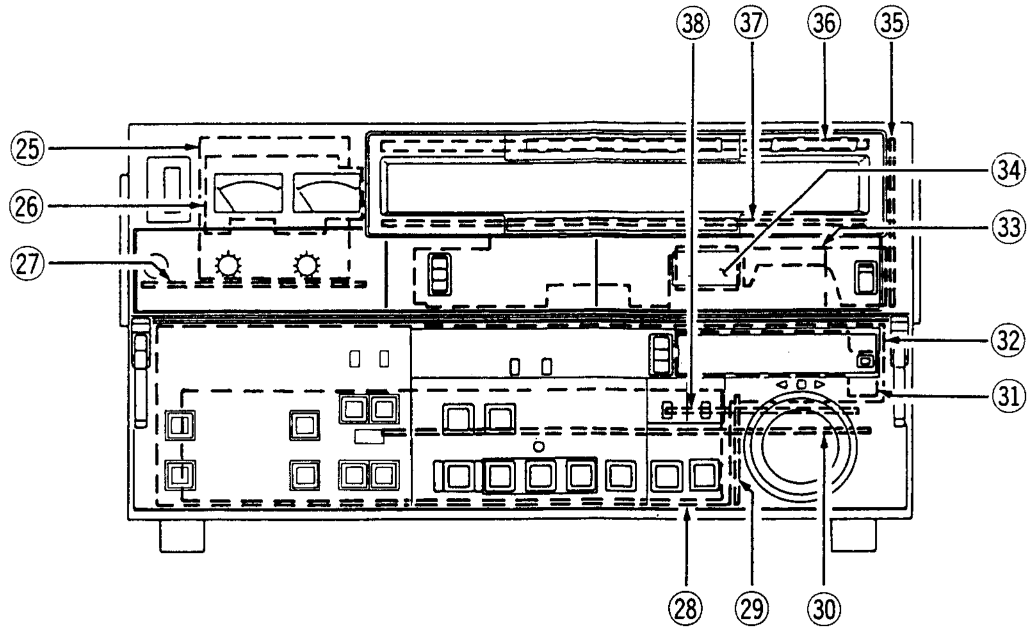
*Dolby noise reduction manufactured under licence from Dolby Laboratories Licensing Corporation. "DOLBY" and the double-D symbol DD are trademarks of Dolby Laboratories Licensing Corporation.

2-2. MAIN PARTS LOCATION

2-2-1. Location of Printed Circuit Board



① VP-33 board
② TBC-18 board
③ SS-48 board
④ PTC-54 board
⑤ PTC-49 board
⑥ MB-322 board
⑦ TR-73 board
⑧ RM-82 board
⑨ PTC-42 board
⑩ DE-15 board
⑪ PTC-55 board
⑫ RM-82 board
⑬ TR-73 board
⑭ PD-56 board
⑮ DS-31 board
⑯ Switching regulator
⑰ AC-133 board
⑱ CP-167 board
⑲ RP-57 board
⑳ AU-148 board
㉑ AU-149 board
㉒ AU-150 board
㉓ CP-166 board
㉔ RM-93 board

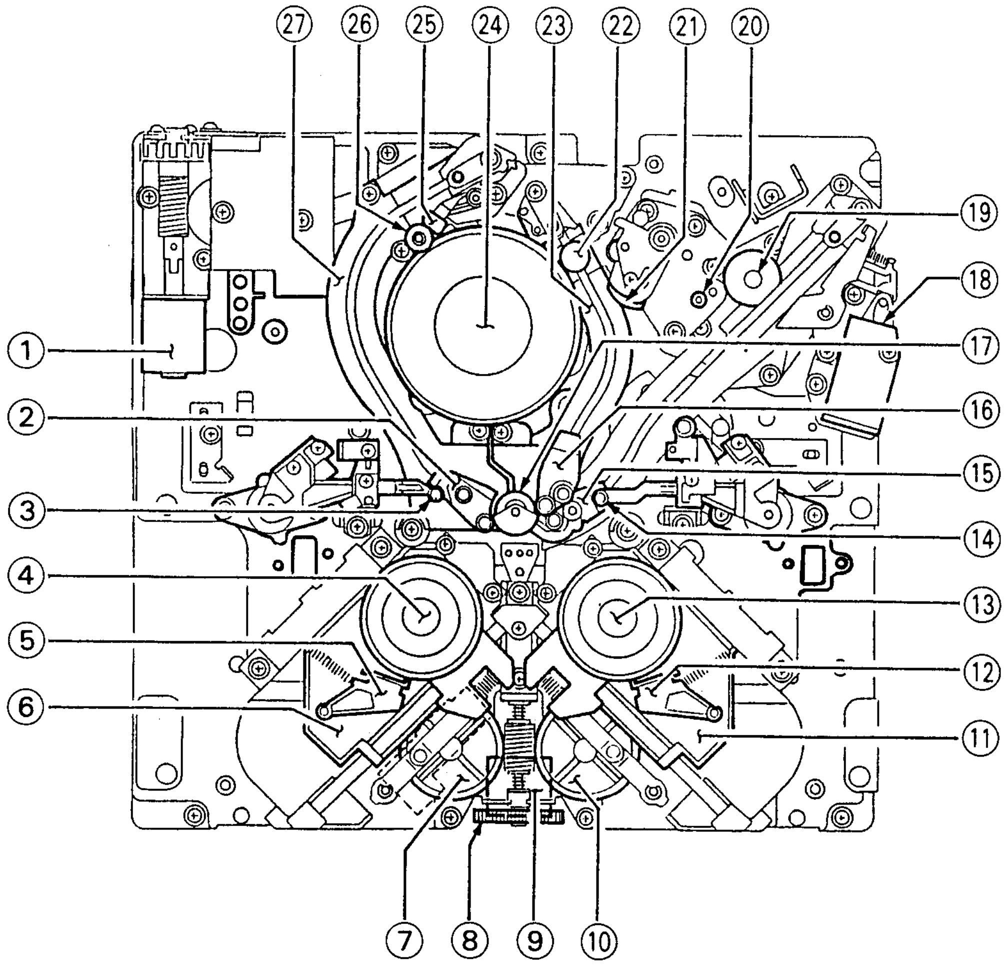


㉕ MA-44 board
㉖ DP-138 board
㉗ VR-116 board
㉘ HC-14 board
㉙ PTC-39 board
㉚ DR-118 board
㉛ DP-139 board
㉜ KY-210 board
㉝ SW-444 board
㉞ DP-159 board
㉟ CL-25 board (cassette compartment)
㊱ LP-57 board (cassette compartment)
㊲ PC-62 board (cassette compartment)
㊳ DT-29 board
㊴ DT-30 board

INDEX

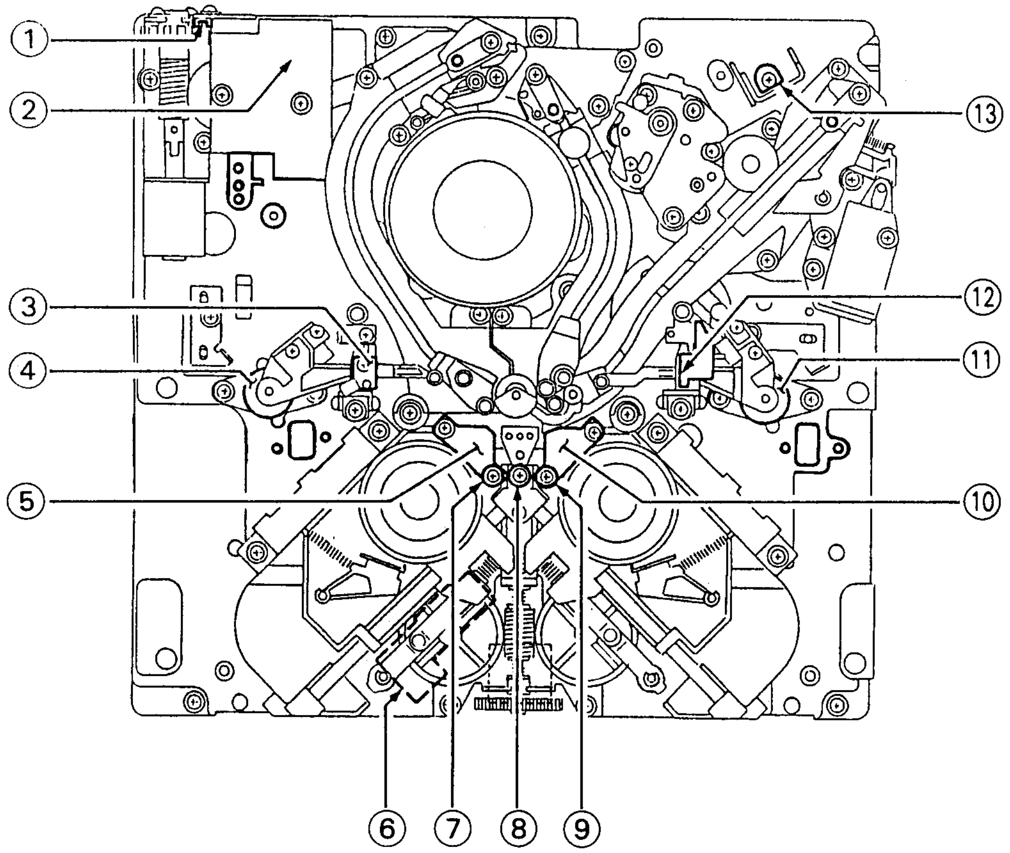
AC-133 board ……………………⑰
AU-148 board ……………………⑳
AU-149 board ……………………㉑
AU-150 board ……………………㉒
CL-25 board ……………………㉟
CP-166 board ……………………㉓
CP-167 board ……………………⑱
DE-15 board ……………………⑩
DP-138 board ……………………㉖
DP-139 board ……………………㉛
DP-159 board ……………………㉞
DR-118 board ……………………㉚
DS-31 board ……………………⑮
DT-29 board……………………㊳
DT-30 board……………………㊴
HC-14 board……………………㉘
KY-210 board ……………………㉜
LP-57 board ……………………㊱
MA-44 board ……………………㉕
MB-322 board ……………………⑥
PC-62 board ……………………㊲
PD-56 board……………………⑭
PTC-39 board ……………………㉙
PTC-42 board ……………………⑨
PTC-49 board ……………………⑤
PTC-54 board ……………………④
PTC-55 board ……………………⑪
RM-82 board ……………………⑧ : [Supply side] ; ⑫ : [Take-up side]
RM-93 board ……………………㉔
RP-57 board……………………⑲
SS-48 board ……………………③
SW-444 board ……………………㉝
TBC-18 board ……………………②
TR-73 board……………………⑦ : [Supply side] ; ⑬ : [Take-up side]
VP-33 board……………………①
VR-116 board ……………………㉗
switching regulator …………⑯

2-2-2. Location of Mechanical Parts/Components



① Threading motor
② S slider
③ S tension regulator arm
④ S reel table
⑤ S brake
⑥ S reel motor plate
⑦ S worm wheel
⑧ Reel shift driver gear
⑨ Reel shift motor
⑩ T worm wheel
⑪ T reel motor plate
⑫ T brake
⑬ T reel table
⑭ T tension regulator arm
⑮ P slider
⑯ T slider
⑰ Pinch roller
⑱ Pinch solenoid
⑲ Capstan shaft
⑳ TG-6 tape guide
㉑ Audio/TC head
㉒ Cleaning roller
㉓ T rail
㉔ Head drum
㉕ CTL head
㉖ TG-4 tape guide
㉗ S rail

2-2-3. Location of Sensor (1)



① Threading motor rotation sensor

Threading motor rotation sensor detects the rotation speed of the threading motor.

The FG output signal from this sensor inputs to servo circuit, and controls the threading speed to protects the tape from damage.

② Threading-end/unthreading-end sensor
This sensor detects whether the threading ring reaches the threading-end or unthreading-end position.

③ Tape end sensor
During tape travelling in the FWD direction, tape end sensor detects the end of tape.

④ S tension regulator arm sensor
During playback, S tension regulator arm activates to keep a constant tape tension.
S tension regulator arm sensor detects the position of the S tension regulator arm.

⑤ S reel rotation sensor
S reel rotation sensor detects the rotation of the S reel table.
The FG output signal from this sensor inputs to servo circuit, and controls the rotation speed and torque of the reel motor.

⑥ Reel L/S position sensor
This sensor detects whether the reel table moves to the correct position according to the size of the inserted cassette tape.

⑦ Reel hub diameter sensor
The reel hub diameter varies depending on the length of the tape wound on a cassette tape. The reel hub diameter sensor detects the reel hub diameter using a tub on the back side of the cassette tape.
The output signal of this sensor inputs to servo circuit, and controls the rotation speed and torque of the reel motor.

⑧ Oxide tape sensor
This sensor detects whether an oxide tape or metal particle tape is being inserted to the unit using a tub on the back side of the cassette tape.

⑨ Tape thickness sensor
This sensor detects the thickness of the wound tape that is being inserted to the unit using a tub on the back side of the cassette tape.

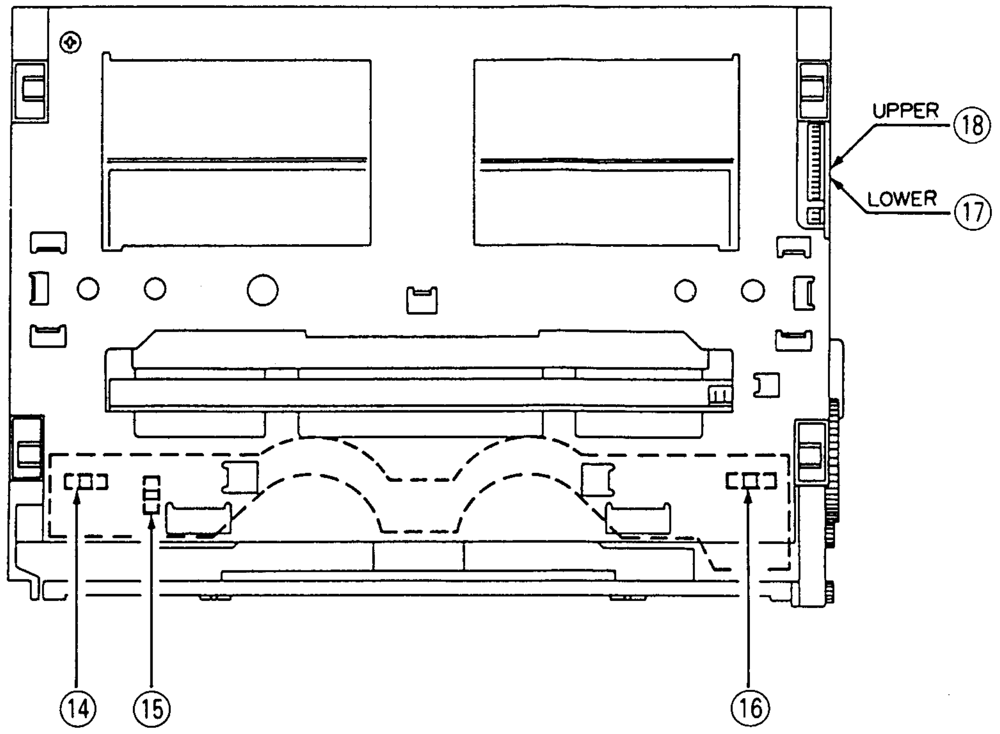
⑩ T reel rotation sensor
T reel rotation sensor detects the rotation of the T reel table.
The FG output signal from this sensor inputs to servo circuit, and controls the rotation speed and torque of the reel motor.

⑪ T tension regulator arm sensor
During playback, T tension regulator arm activates to keep a constant tape tension.
T tension regulator arm sensor detects the position of the T tension regulator arm.

⑫ Tape beginning sensor
During tape travelling in the FWD direction, tape beginning sensor detects the beginning of tape.

⑬ Condensation sensor
This sensor detects whether the moisture condensation occures in the unit.

2-2-4. Location of Sensor (2)……Cassette Compartment



⑭ Cassette-in sensor (L)
This sensor detects whether a cassette is being inserted.

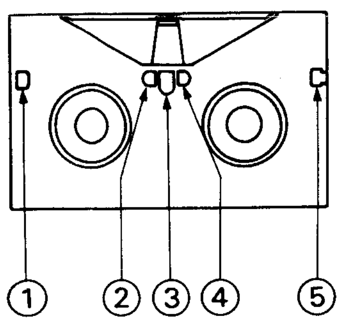
⑮ Cassette L/S size sensor
This sensor detects whether the inserted cassette tape is an L size on S size.

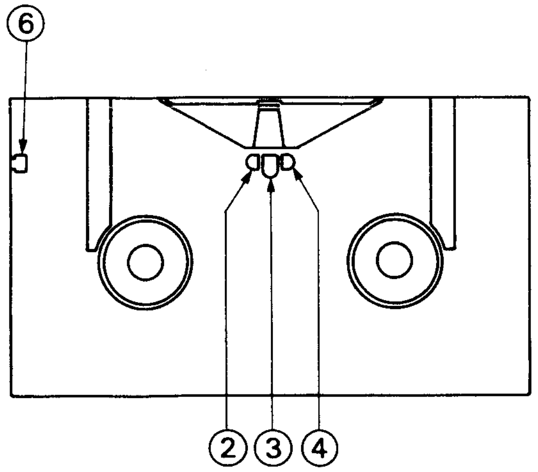
⑯ Cassette-in sensor (R)
This sensor detects whether a cassette is being inserted.

⑰ Cassette-down (2) sensor
⑱ Cassette-down (1) sensor
(1) sensor detects the position of the cassette compartment by using the combination of ON/OFF operation of these sensors and cassette-in sensor.

2-2-5. Function of the Cassette Plug and Tab

As shown in the figure below, plugs and tabs are provided at the back side of the cassette tape.





① S cassette Miss-REC tab (for oxide tape)
② Video tape thickness detection tab
③ Oxide tape detection tab
④ Reel hab diameter detection tab
⑤ S cassette Miss-REC plug (for metal particle tape)
⑥ L cassette Miss-REC plug

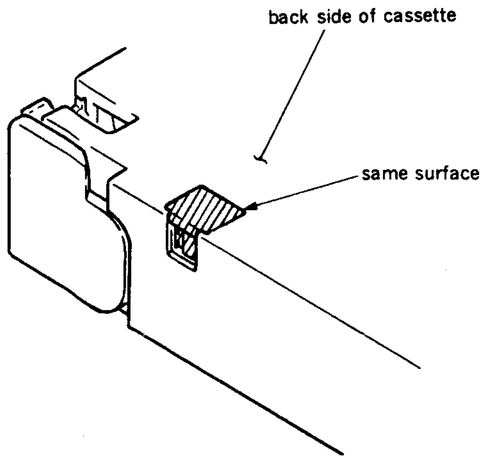


Fig. 1

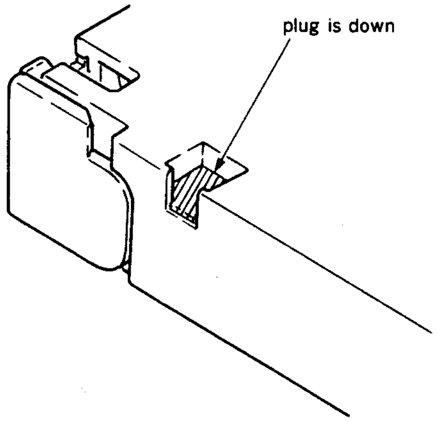


Fig. 2

The presence or absence of these plugs and tabs determines the cassette status as shown in the table below.

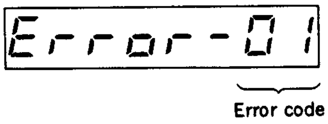
Plug and tab	Cassette status with plugs and tabs	Cassette status without plugs and tabs
S cassette Miss-REC tab (for oxide tape)	Can be recorded (refer to Fig.1).	Cannot be recorded (refer to Fig.2).
S cassette Miss-REC plug (for metal particle tape)		
L cassette Miss-REC plug		
Tape thickness detection tab	A 20 μm thick tape is wound on the cassette.	A 15 μm thick tape is wound on the cassette.
Oxide tape detection tab	An oxide tape is wound on the cassette.	A metal particle tape is wound on the cassette.
Reel hub diameter detection tab	For small hub	For large hub

(NOTE) This unit cannot record.

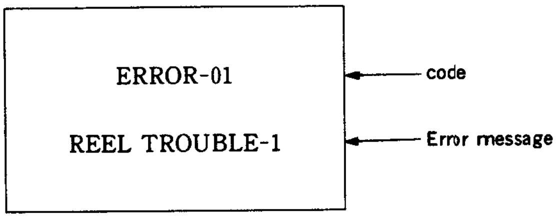
2-3. ERROR MESSAGE

This unit features self-diagnostics.
When trouble is detected, an error code is displayed immediately in the time counter display on the control panel, an error code and message are displayed on the picture monitor.
Furthermore, as for the interface error (error code 92,93), interface object which error occured replaced by sub error massage on the picture monitor.
(To display error code and message on the monitor, the monitor must be connected to the VIDEO OUTPUT 3 connector or MONITOR OUT connector, and the CHARACTER switch on the sub control panel must be set to ON.)

Time counter display

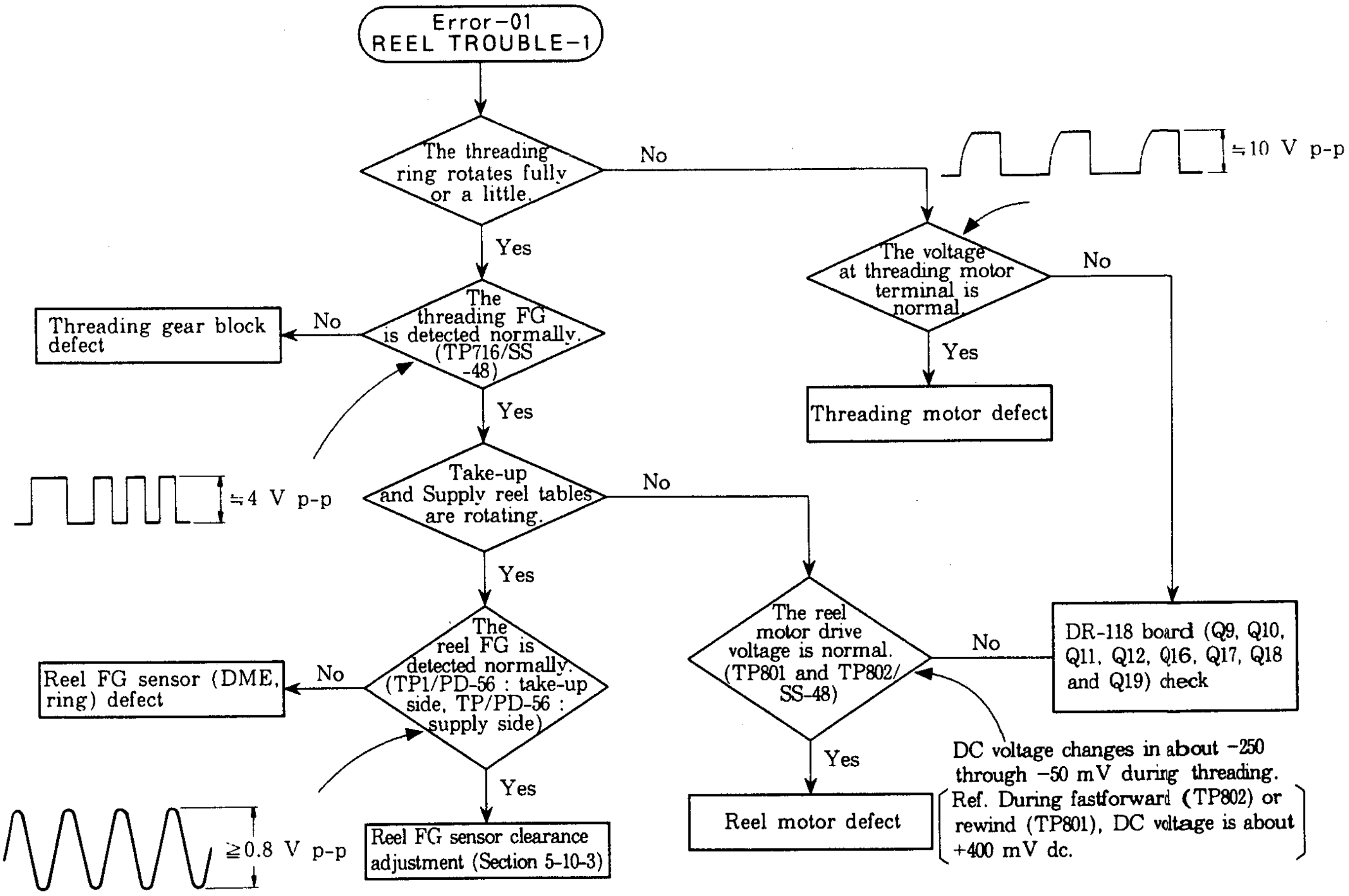


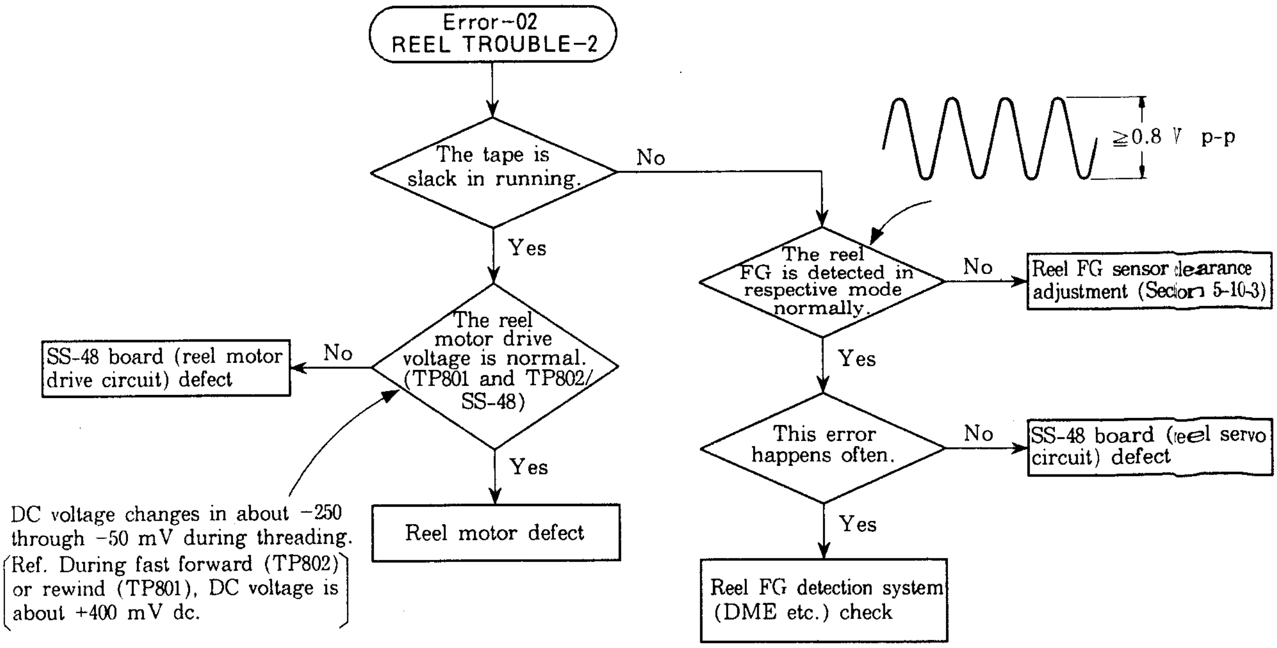
Picture monitor display

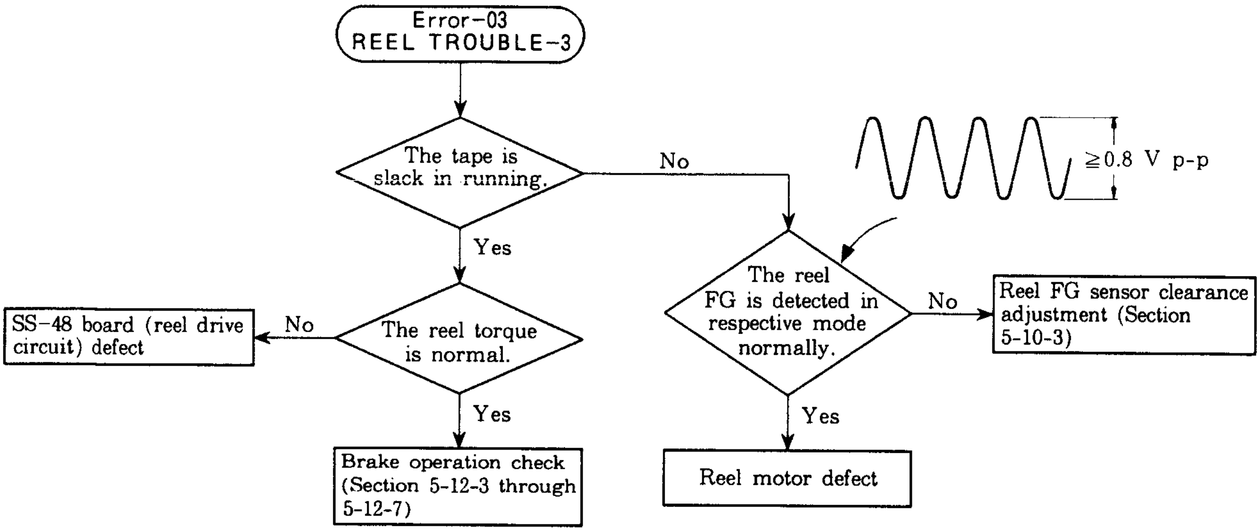


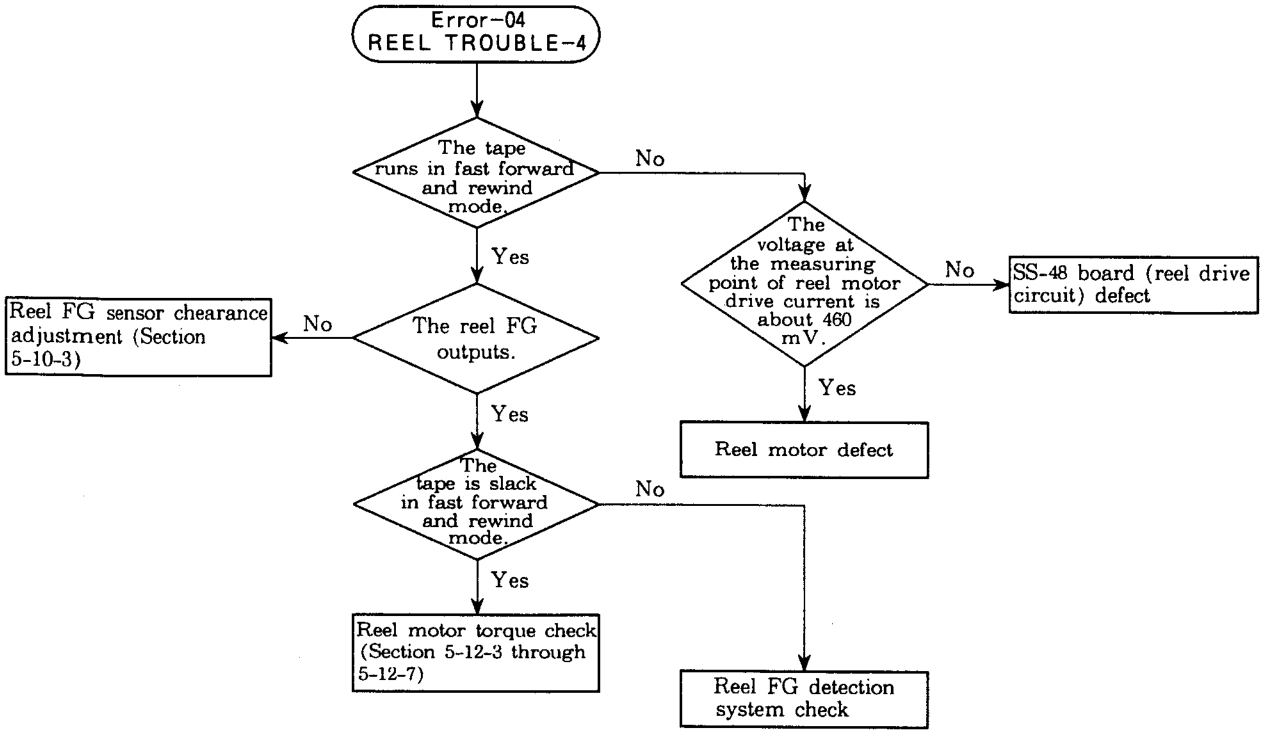
code	error message	description	detection
01	REEL TROUBLE-1	The slack of the tape is detected during threading or unthreading, and then tape protection is done.	Detected when the ratio of the FG frequency at a supply reel, take-up reel and threading ring is less than the specified value.
02	REEL TROUBLE-2	The slack or breaking of the tape is detected in search, fast foward, or rewind mode, and then tape protection is done.	Detected when the ratio of the FG frequency at a supply reel and take-up reel is less than the specified value.
03	REEL TROUBLE-3	The slack or breaking of the tape is detected in recording or playback mode, or either of the lock of the supply or take-up reel is detected, and then tape protection is done.	Detected when the FG frequency at a supply or take-up reel is zero (0), or when the tension detected from a tension sensor is less than 15 g.
04	REEL TROUBLE-4	It is detected that the tape does not run at the speed of designation in fast forward or rewind mode, and then tape protection is done.	Depends on the comparison between the tape speed using the FG frequency at supply and take-up reels and the designated speed.
05	REEL TROUBLE-5	It is detected that the supply or take-up reel cannot stop with a cassette is not inserted, or detected that over current has been flowing to supply and take-up reels.	Detected using the FG frequency or current at supply and take-up reels.
06	TAPE TENSION ERROR	When excessive tension is detected, tape protection is done.	Detected when the tension detected from a tension sensor is more than 55 g.
07	CAPSTAN TROUBLE	It is detected that the tape does not run at the speed of designation in play or search mode, and tape protection is done.	Detected at the tape speed detected from the FG frequency at a capstan motor.
08	DRUM TROUBLE	It is detected that drum motor rotation is not normal, and then tape protection is done.	Detected when the drum speed obtained from the speed FG of the drum motor is less than the specified value.
09	TH/UNTH MOTOR TIME OUT	It is detected that threading or unthreading is not completed, and then tape protection is done.	Detected when threading or unthreading is not completed within ten seconds after it is started.

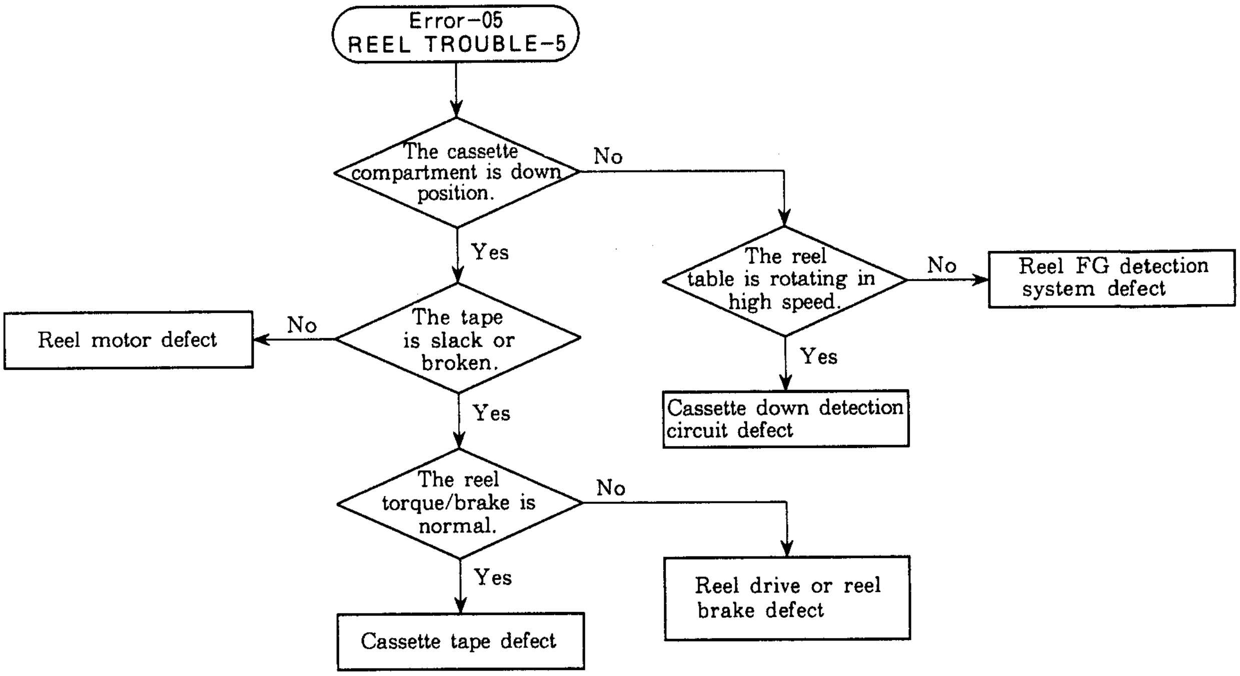
code	error message	description	detection
0A	**THREADING TROUBLE**	It is detected that threading cannot be done, and then tape protection is done.	Detected when the tape beginning sensor is acted during threading after the short FF mode is automatically entered three times.
10	**HUMID**	Condensation is detected.	Detected using a condensation sensor.
11	**TAPE BEGINNING/END SENSOR TROUBLE**	The tape beginning or end sensor operation is defective.	Detected when the tape beginning and end are detected at the same time.
12	**TAPE BEGINNING SENSOR TROUBLE**	The tape beginning sensor operation is defective.	Detected when the tape beginning continues for more than seven seconds.
13	**TAPE END SENSOR TROUBLE**	The tape end sensor operation is defective.	Detected when the tape end continues for more than seven seconds.
14	**FAN MOTOR TROUBLE**	The operation of the fan motor is defective.	Detected according to the period of a ripple noise at the fan motor terminal.
20	**CASSETTE COMPARTMENT MOTOR LOCK**	It is detected that cassette up/down operation is not completed, and then tape protection is done.	Detected when cassette up/down operation is not completed within four seconds after it is started.
21	**REEL TABLE MOTOR LOCK**	It is detected that driving of the L position to S position or the S position to L position in the reel table is not completed, and then tape protection operation is done.	Detect when reel table driving is not completed within four seconds after it is started.
22	**REEL TABLE SENSOR TROUBLE**	The operation of the L/S position detection sensor of the reel table is defective.	Detected when the L and S positions are detected at the same time.
90	**KEY INTERFACE ERROR**	The interface between the keyboard and system control is defective.	Detected when no interface signal is sent from the system control to the keyboard.
91	**1/2 VD NOT EXIST**	No 1/2 VD signal input to system control is detected.	Detected when no 1/2 VD signal input to system control.
92	**INTERNAL SERIAL INTERFACE ERROR** **sub error message** **HC** **TBC**	The serial interface between the HC-14 board, TBC-18 board and system control is defective. HC : IC1/HC-14 TBC : IC717/TBC-18	Detected when no interface signal is sent from the each board to the system control three times continuously.
93	**CPU INITIALIZE ERROR** **sub error message** **servo (main)** **servo (sub)** **time code**	The interface between the time code and system control, or the servo and system control is defective when the POWER switch is turned ON. servo (main) : IC604/SS-48 servo(sub) : IC710/SS-48 time code : IC403/SS-48	Detected when the interface signal from the time code or servo system to the system control when the POWER switch is turned ON is defect.
96	**SY NV-RAM TROUBLE**	The operational defect of the NV-RAM (setup menu data) is detected on the HC-14 board. Then, reset the data in the NV-RAM to the condition at exfactory.	Detected by the NV-RAM data's checksum.
97	**SV NV-RAM TROUBLE**	The operational defect of the NV-RAM (servo adjustment data) is detected on the DR-118 board.	Detected by the NV-RAM data's checksum.

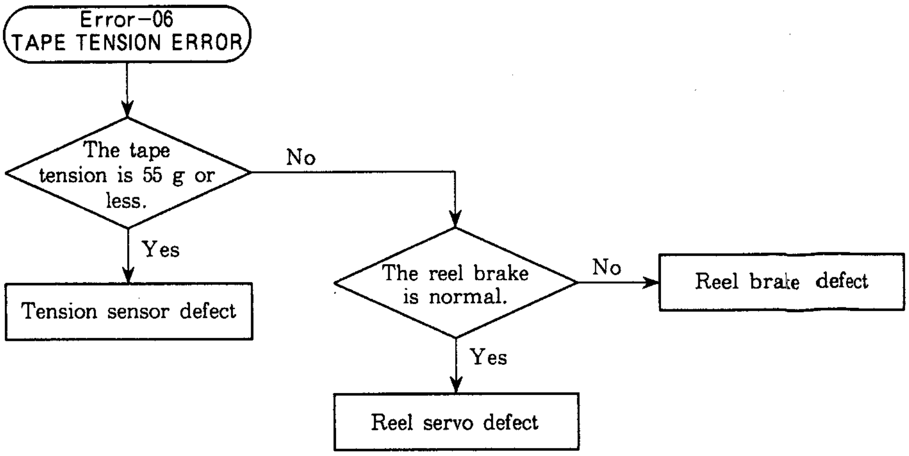

Error-01
REEL TROUBLE-1
The threading ring rotates fully or a little.
No
Yes
≒10 V p-p
The voltage at threading motor terminal is normal.
No
Yes
Threading motor defect
Threading gear block defect
No
The threading FG is detected normally. (TP716/SS-48)
Yes
≒4 V p-p
Take-up and Supply reel tables are rotating.
No
Yes
The reel motor drive voltage is normal. (TP801 and TP802/SS-48)
No
DR-118 board (Q9, Q10, Q11, Q12, Q16, Q17, Q18 and Q19) check
Reel FG sensor (DME, ring) defect
No
The reel FG is detected normally. (TP1/PD-56 : take-up side, TP/PD-56 : supply side)
Yes
Yes
Reel motor defect
DC voltage changes in about −250 through −50 mV during threading.
Ref. During fastforward (TP802) or rewind (TP801), DC voltage is about +400 mV dc.
≧0.8 V p-p
Reel FG sensor clearance adjustment (Section 5-10-3)

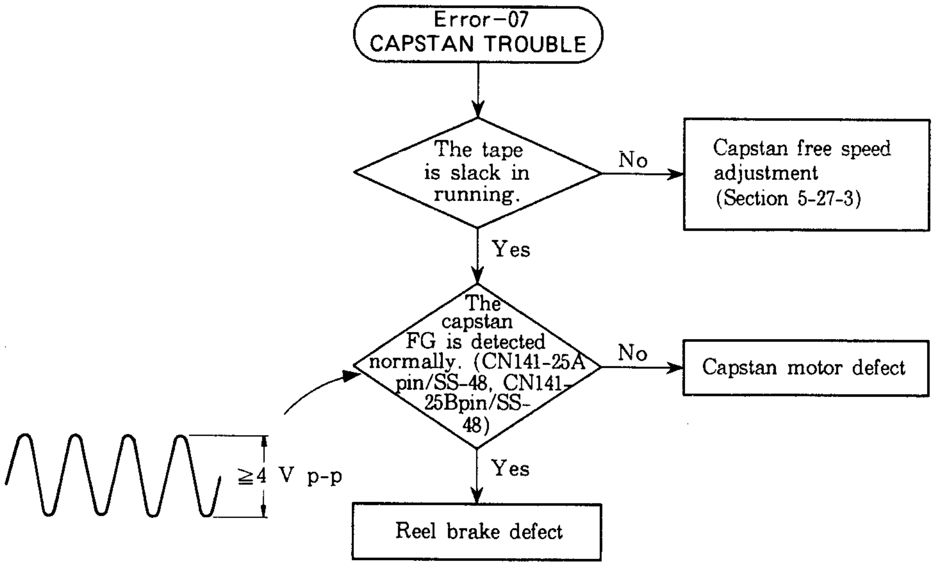

Error-02
REEL TROUBLE-2
The tape is slack in running.
No
Yes
≧0.8 V p-p
The reel FG is detected in respective mode normally.
No
Reel FG sensor clearance adjustment (Section 5-10-3)
Yes
SS-48 board (reel motor drive circuit) defect
No
The reel motor drive voltage is normal. (TP801 and TP802/SS-48)
This error happens often.
No
SS-48 board (reel servo circuit) defect
Yes
Yes
DC voltage changes in about −250 through −50 mV during threading.
Ref. During fast forward (TP802) or rewind (TP801), DC voltage is about +400 mV dc.
Reel motor defect
Reel FG detection system (DME etc.) check

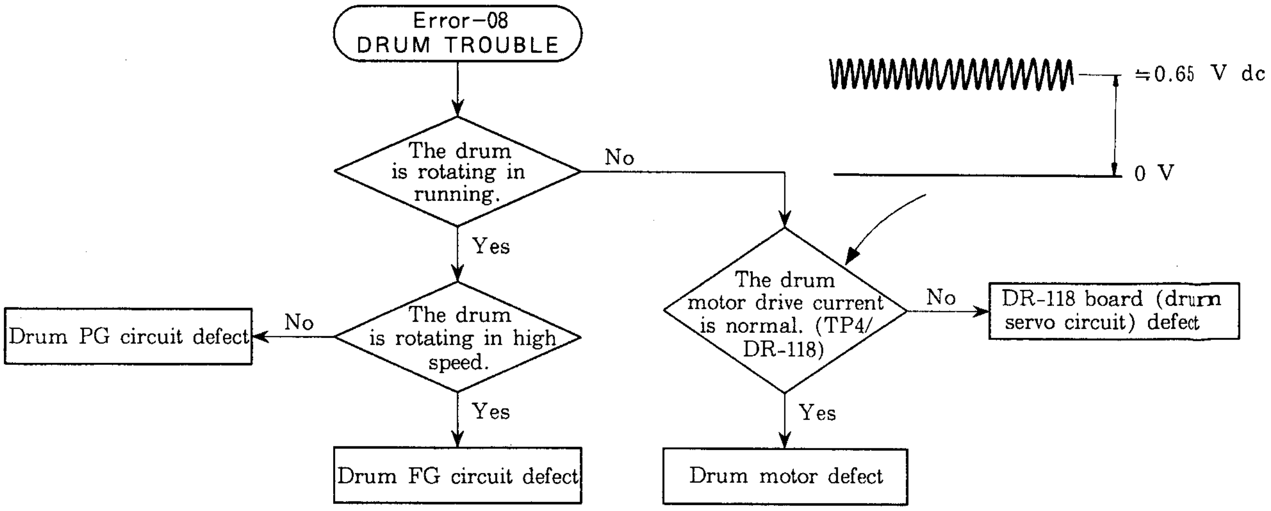

Error−03
REEL TROUBLE−3
The tape is slack in running.
No
≧0.8 V p-p
Yes
The reel FG is detected in respective mode normally.
No
Reel FG sensor clearance adjustment (Section 5-10-3)
SS−48 board (reel drive circuit) defect
No
The reel torque is normal.
Yes
Yes
Brake operation check (Section 5-12-3 through 5-12-7)
Reel motor defect

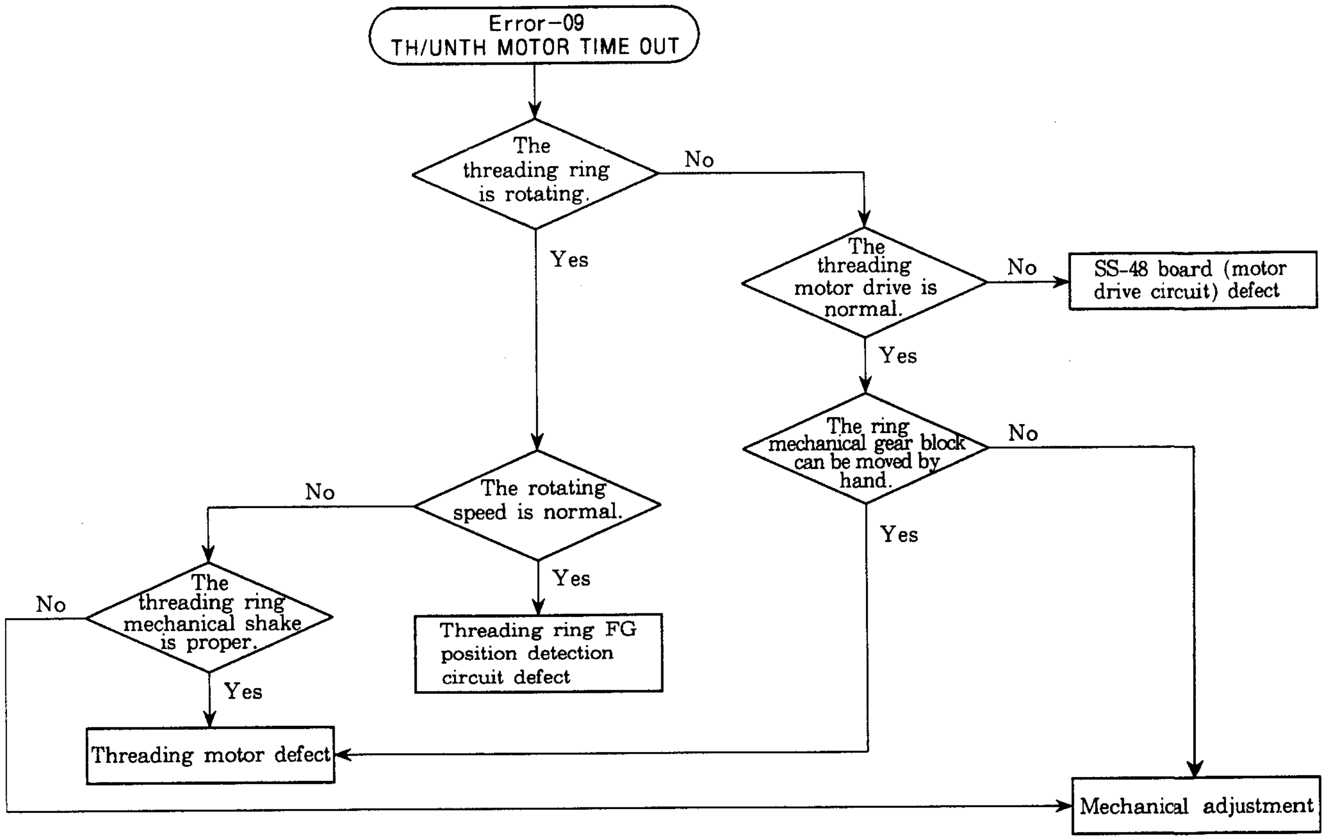

Error−04
REEL TROUBLE−4
The tape runs in fast forward and rewind mode.
No
Yes
The voltage at the measuring point of reel motor drive current is about 460 mV.
No
SS-48 board (reel drive circuit) defect
Reel FG sensor chearance adjustment (Section 5-10-3)
No
The reel FG outputs.
Yes
Yes
Reel motor defect
The tape is slack in fast forward and rewind mode.
No
Yes
Reel motor torque check (Section 5-12-3 through 5-12-7)
Reel FG detection system check

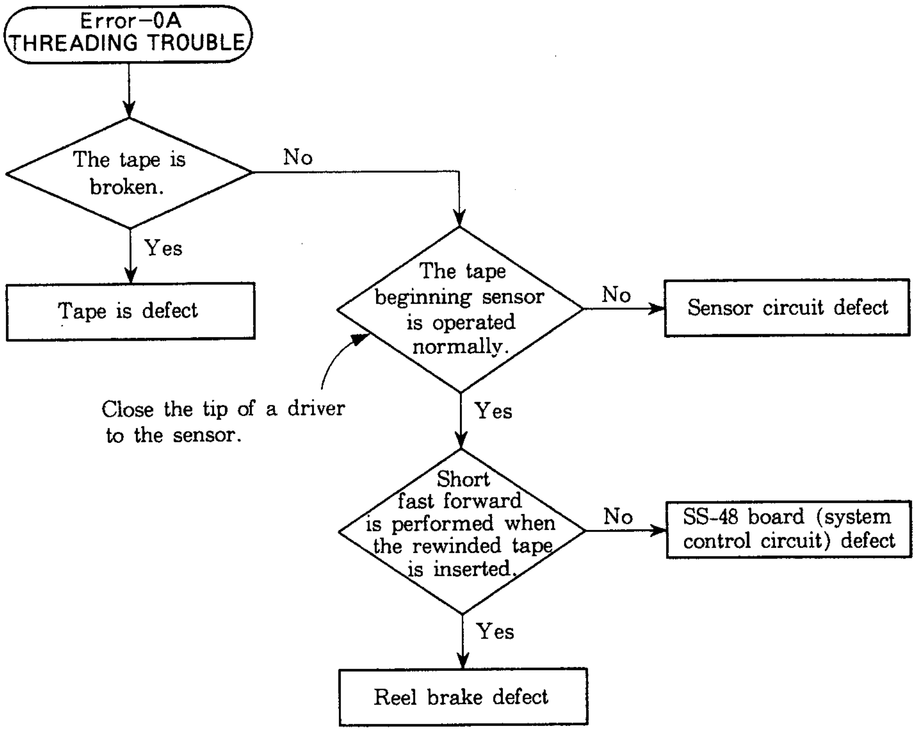

Error−05
REEL TROUBLE−5
The cassette compartment is down position.
No
Yes
The reel table is rotating in high speed.
No
Reel FG detection system defect
Yes
Cassette down detection circuit defect
The tape is slack or broken.
No
Reel motor defect
Yes
The reel torque/brake is normal.
No
Reel drive or reel brake defect
Yes
Cassette tape defect

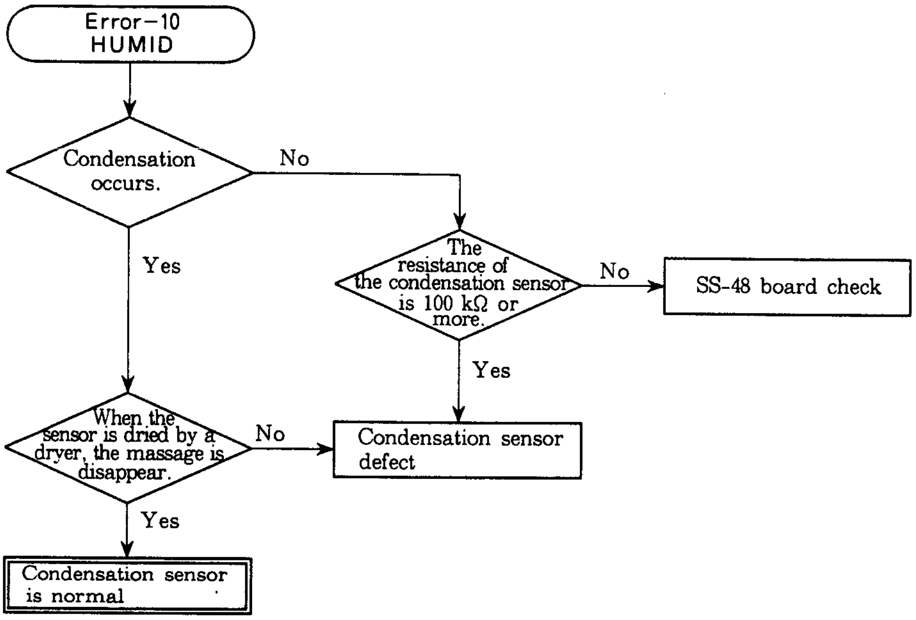

Error−06
TAPE TENSION ERROR
The tape tension is 55 g or less.
No
Yes
Tension sensor defect
The reel brake is normal.
No
Reel brake defect
Yes
Reel servo defect

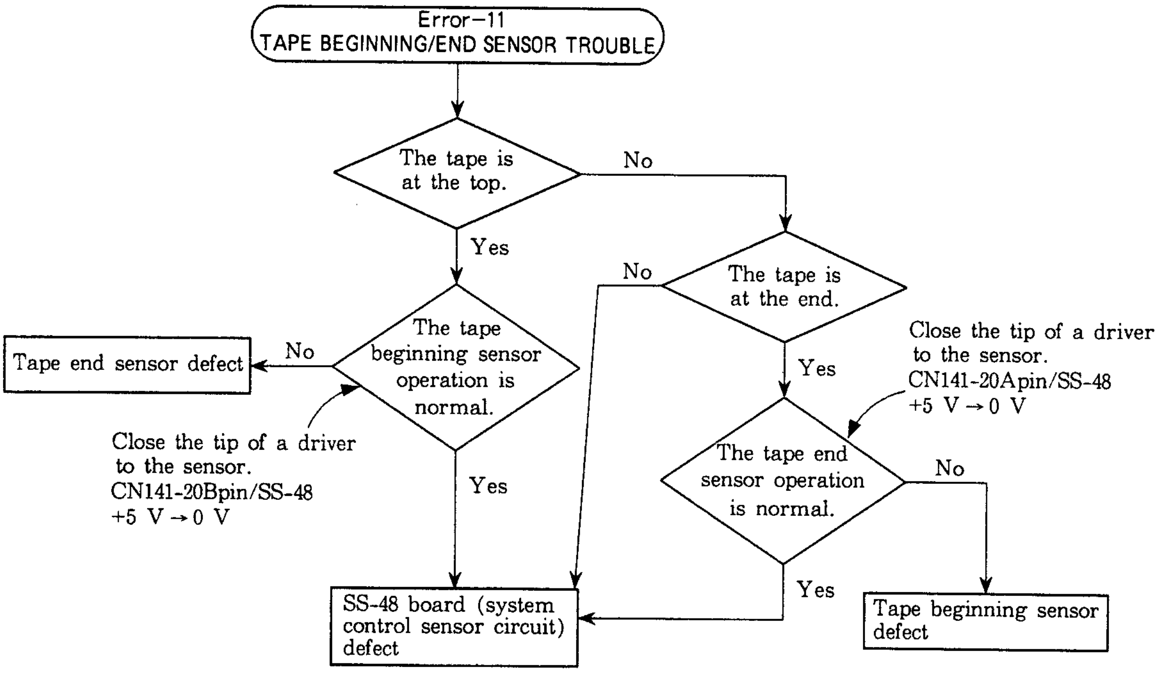

Error–07
CAPSTAN TROUBLE
The tape is slack in running.
No
Capstan free speed adjustment (Section 5-27-3)
Yes
The capstan FG is detected normally. (CN141-25A pin/SS-48, CN141-25Bpin/SS-48)
No
Capstan motor defect
≧4 V p-p
Yes
Reel brake defect

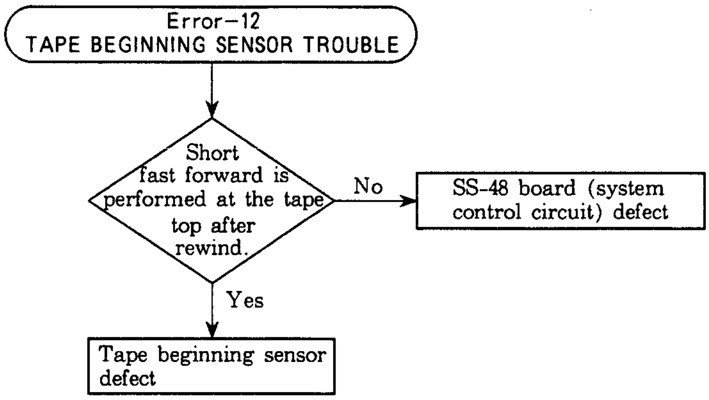

Error–08
DRUM TROUBLE
≒0.65 V dc
0 V
The drum is rotating in running.
No
Yes
The drum is rotating in high speed.
No
Drum PG circuit defect
Yes
Drum FG circuit defect
The drum motor drive current is normal. (TP4/DR-118)
No
DR-118 board (drum servo circuit) defect
Yes
Drum motor defect

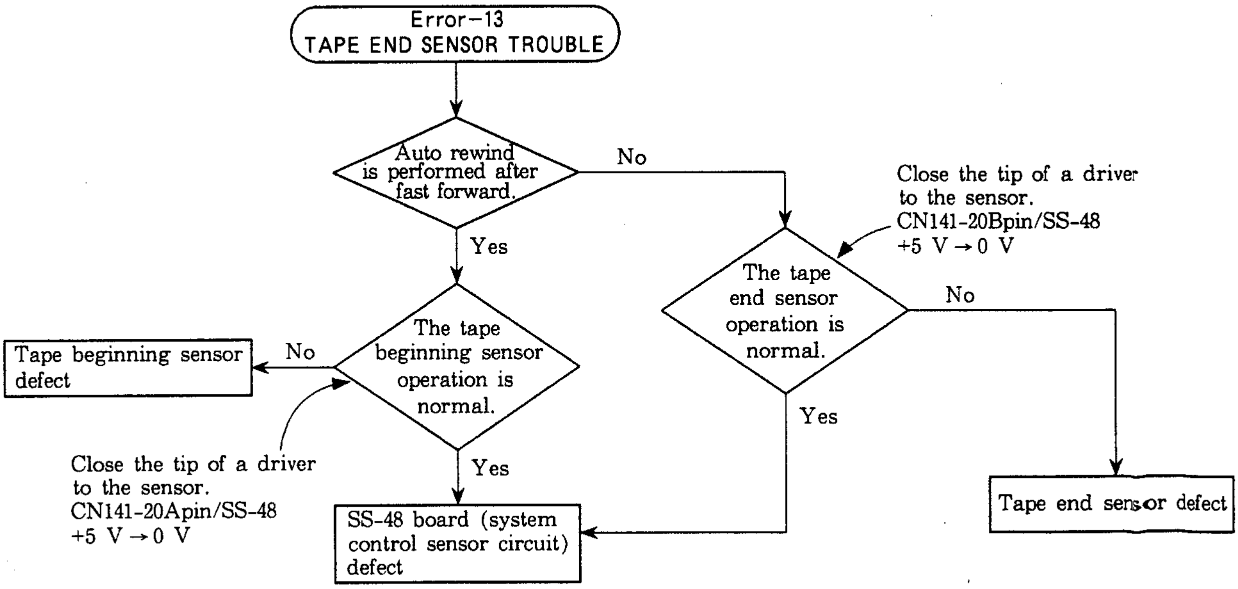

Error-09
TH/UNTH MOTOR TIME OUT
The threading ring is rotating.
No
Yes
The threading motor drive is normal.
No
SS-48 board (motor drive circuit) defect
Yes
The ring mechanical gear block can be moved by hand.
No
Yes
The rotating speed is normal.
No
Yes
The threading ring mechanical shake is proper.
No
Yes
Threading ring FG position detection circuit defect
Threading motor defect
Mechanical adjustment

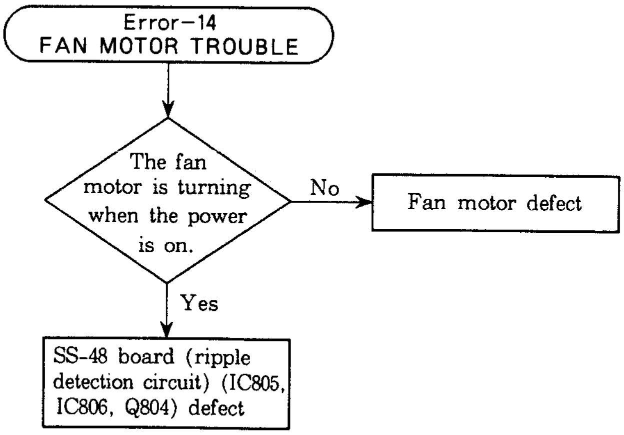

Error-0A
THREADING TROUBLE
The tape is broken.
No
Yes
Tape is defect
The tape beginning sensor is operated normally.
No
Sensor circuit defect
Close the tip of a driver to the sensor.
Yes
Short fast forward is performed when the rewinded tape is inserted.
No
SS-48 board (system control circuit) defect
Yes
Reel brake defect

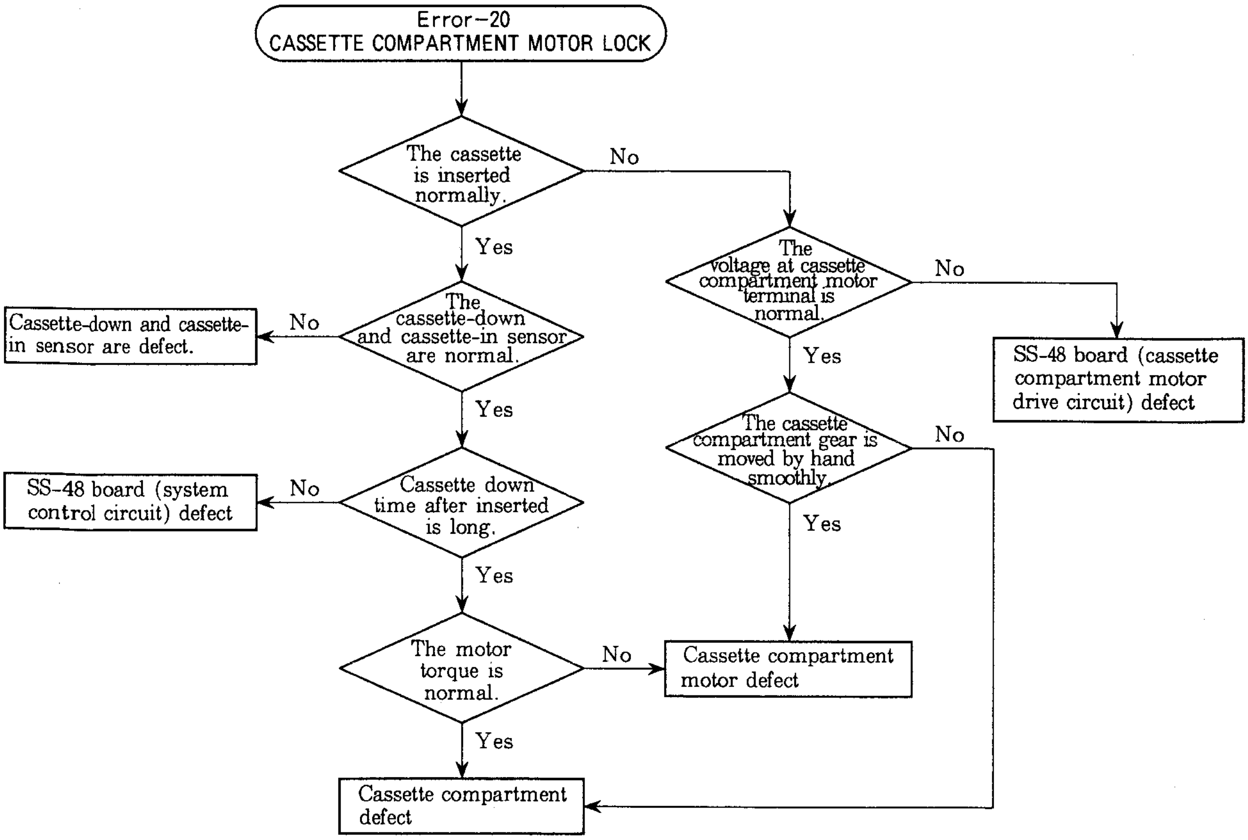

Error-10
HUMID
Condensation occurs.
No
Yes
The resistance of the condensation sensor is 100 kΩ or more.
No
SS-48 board check
Yes
When the sensor is dried by a dryer, the massage is disappear.
No
Condensation sensor defect
Yes
Condensation sensor is normal

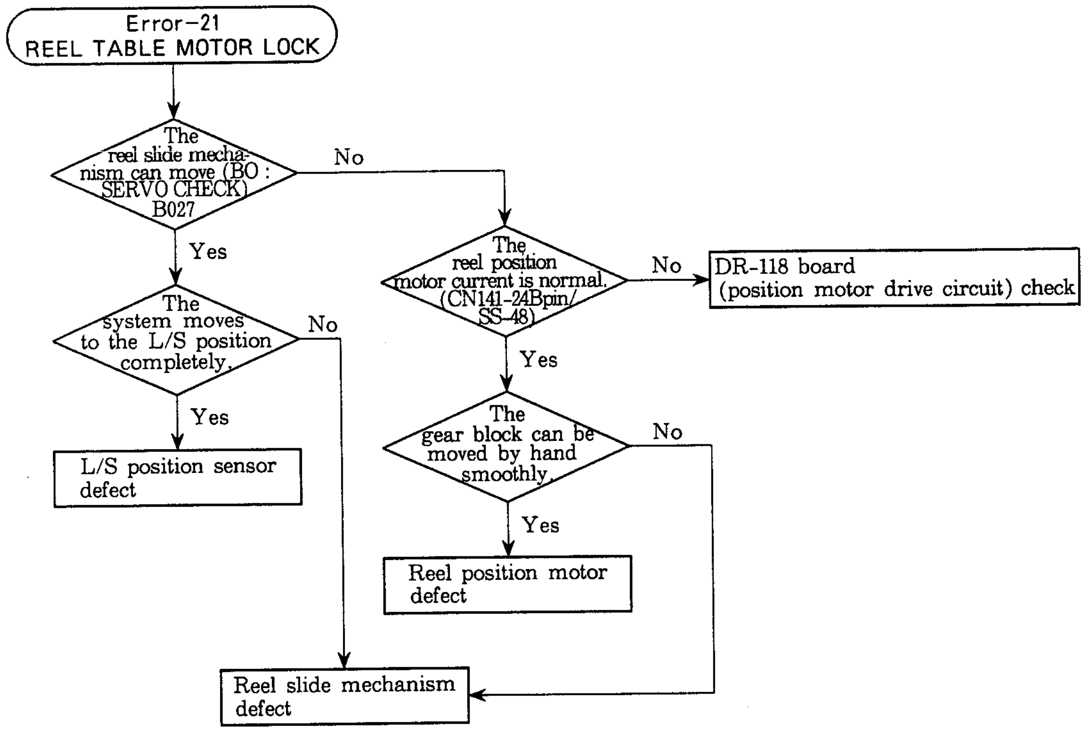

Error-11
TAPE BEGINNING/END SENSOR TROUBLE
The tape is at the top.
No
Yes
The tape beginning sensor operation is normal.
No
Tape end sensor defect
Close the tip of a driver to the sensor.
CN141-20Bpin/SS-48
+5 V → 0 V
Yes
No
The tape is at the end.
Yes
Close the tip of a driver to the sensor.
CN141-20Apin/SS-48
+5 V → 0 V
The tape end sensor operation is normal.
No
Yes
SS-48 board (system control sensor circuit) defect
Tape beginning sensor defect

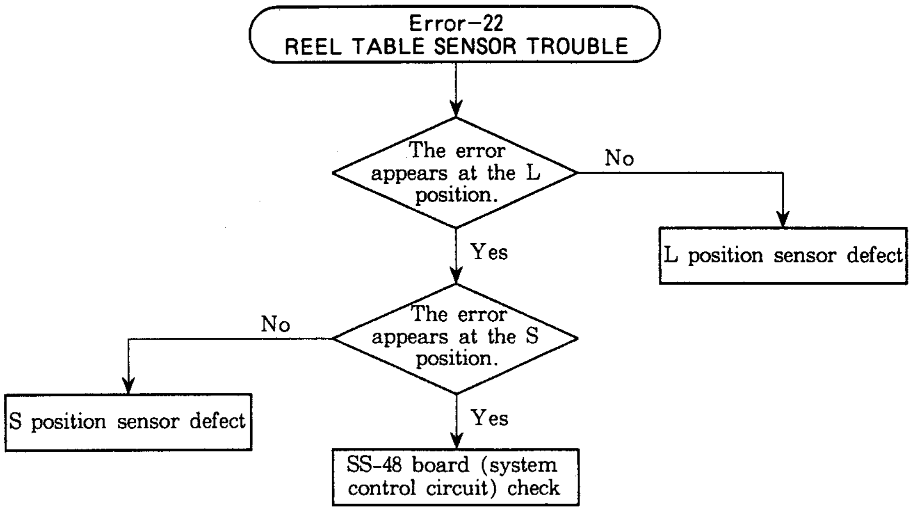

Error−12
TAPE BEGINNING SENSOR TROUBLE
Short fast forward is performed at the tape top after rewind.
No
SS-48 board (system control circuit) defect
Yes
Tape beginning sensor defect

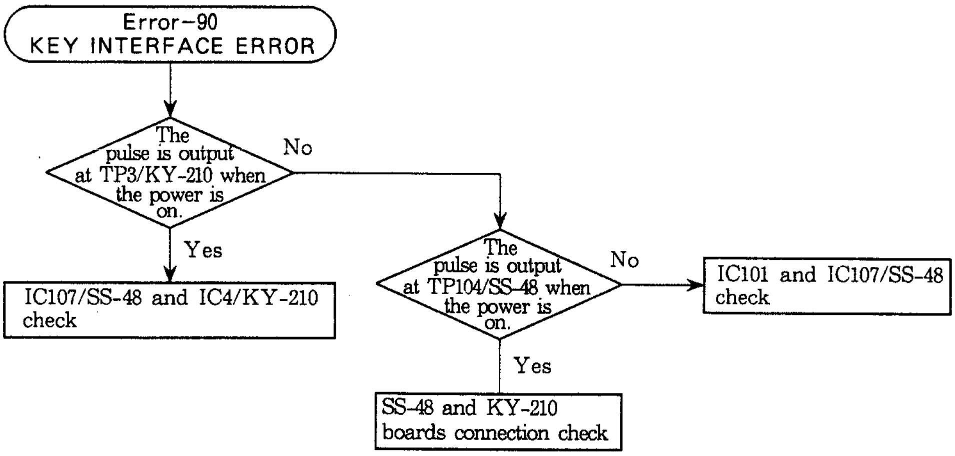

Error−13
TAPE END SENSOR TROUBLE
Auto rewind is performed after fast forward.
No
Yes
Close the tip of a driver to the sensor.
CN141-20Bpin/SS-48
+5 V → 0 V
The tape end sensor operation is normal.
No
Yes
Tape end sensor defect
Tape beginning sensor defect
No
The tape beginning sensor operation is normal.
Close the tip of a driver to the sensor.
CN141-20Apin/SS-48
+5 V → 0 V
Yes
SS-48 board (system control sensor circuit) defect

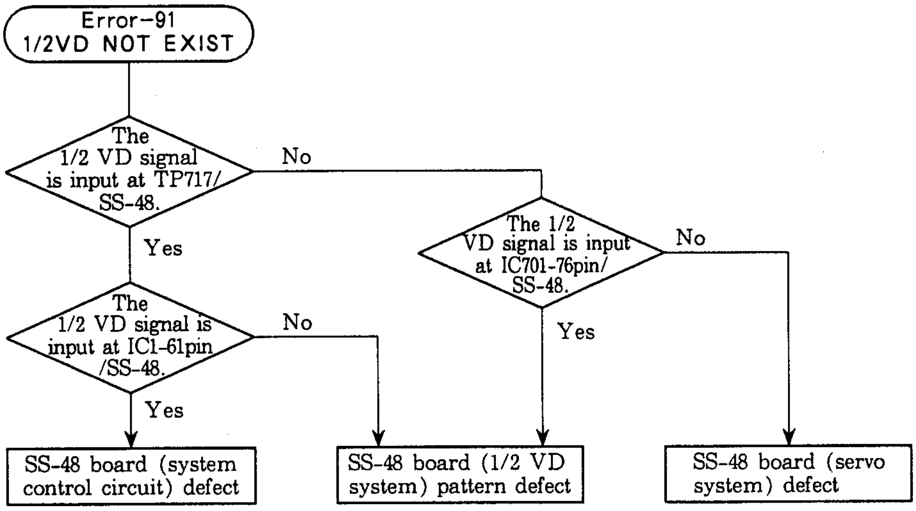

Error−14
FAN MOTOR TROUBLE
The fan motor is turning when the power is on.
No
Fan motor defect
Yes
SS-48 board (ripple detection circuit) (IC805, IC806, Q804) defect

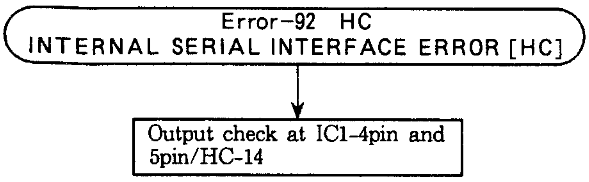

Error−20
CASSETTE COMPARTMENT MOTOR LOCK
The cassette is inserted normally.
No
Yes
The voltage at cassette compartment motor terminal is normal.
No
Yes
SS-48 board (cassette compartment motor drive circuit) defect
The cassette compartment gear is moved by hand smoothly.
No
Yes
The cassette-down and cassette-in sensor are normal.
No
Cassette-down and cassette-in sensor are defect.
Yes
Cassette down time after inserted is long.
No
SS-48 board (system control circuit) defect
Yes
The motor torque is normal.
No
Cassette compartment motor defect
Yes
Cassette compartment defect

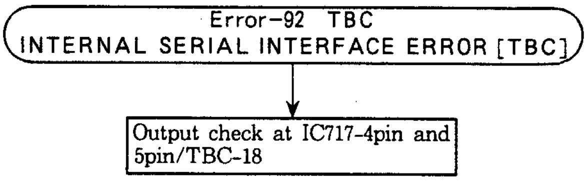

Error–21
REEL TABLE MOTOR LOCK
The reel slide mechanism can move (BO : SERVO CHECK) B027
No
Yes
The reel position motor current is normal. (CN141-24Bpin/ SS-48)
No
DR-118 board (position motor drive circuit) check
The system moves to the L/S position completely.
No
Yes
Yes
The gear block can be moved by hand smoothly.
No
L/S position sensor defect
Yes
Reel position motor defect
Reel slide mechanism defect

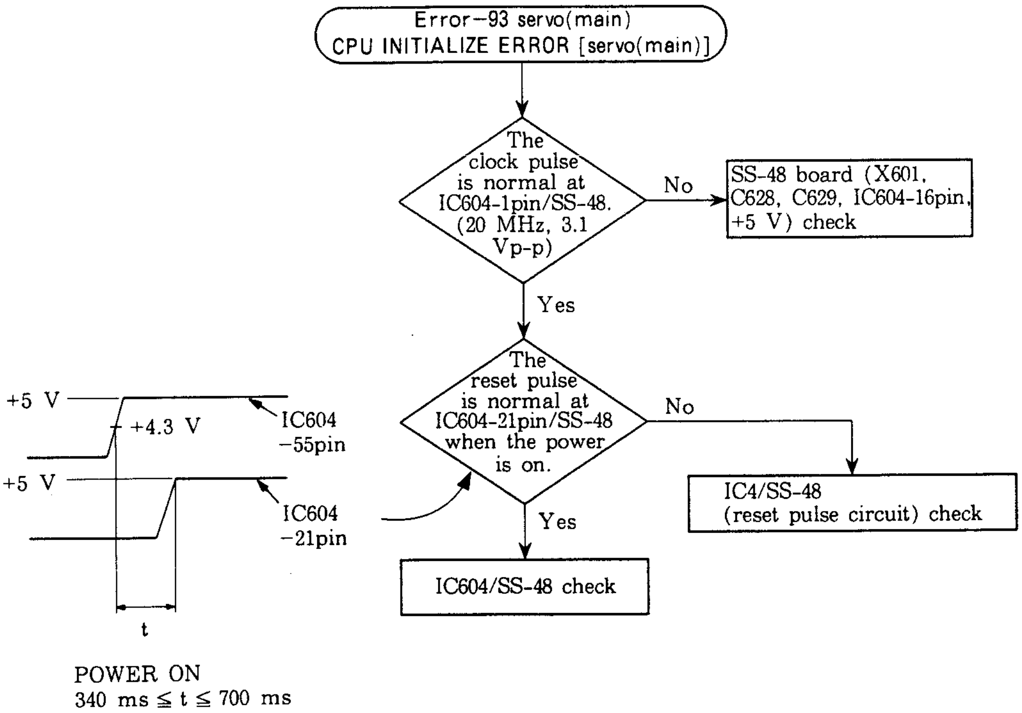

Error–22
REEL TABLE SENSOR TROUBLE
The error appears at the L position.
No
L position sensor defect
Yes
The error appears at the S position.
No
S position sensor defect
Yes
SS-48 board (system control circuit) check

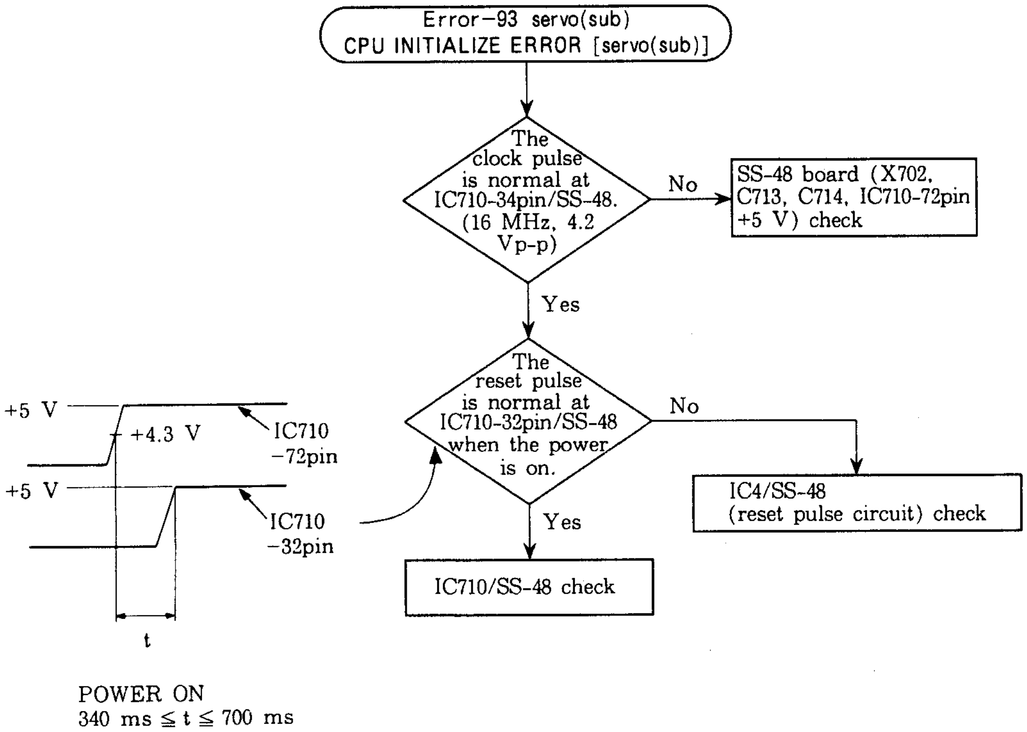

Error-90
KEY INTERFACE ERROR
The pulse is output at TP3/KY-210 when the power is on.
No
Yes
IC107/SS-48 and IC4/KY-210 check
The pulse is output at TP104/SS-48 when the power is on.
No
IC101 and IC107/SS-48 check
Yes
SS-48 and KY-210 boards connection check

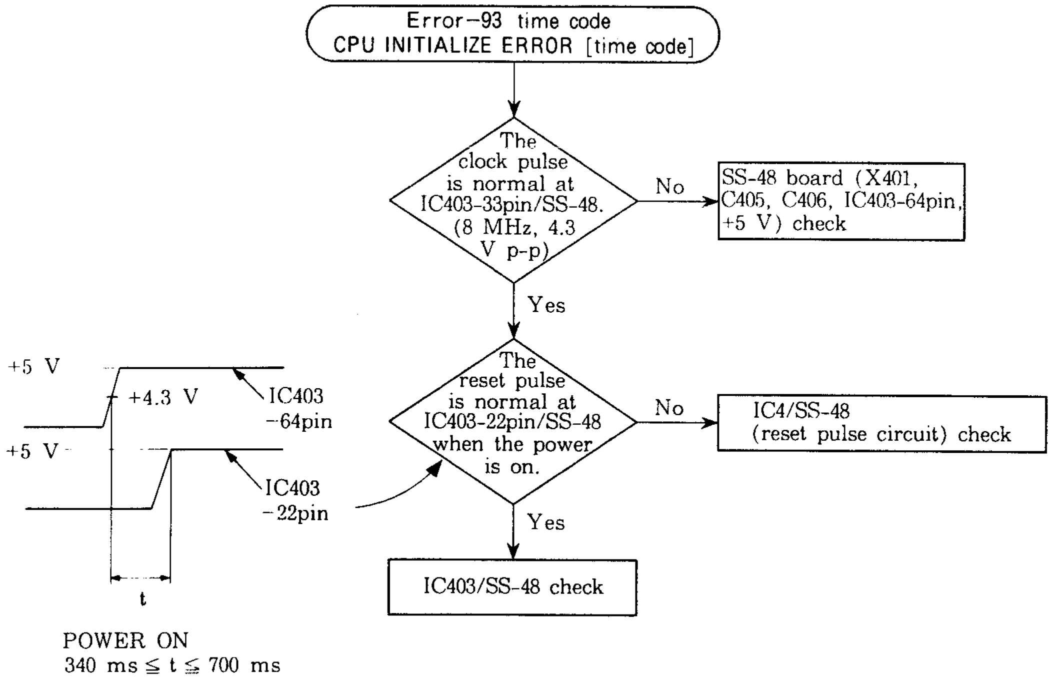

Error-91
1/2VD NOT EXIST
The 1/2 VD signal is input at TP717/SS-48.
No
Yes
The 1/2 VD signal is input at IC701-76pin/SS-48.
No
Yes
The 1/2 VD signal is input at IC1-61pin /SS-48.
No
Yes
SS-48 board (system control circuit) defect
SS-48 board (1/2 VD system) pattern defect
SS-48 board (servo system) defect

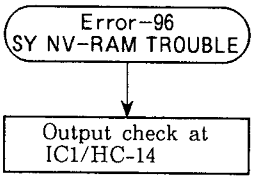

Error-92 HC
INTERNAL SERIAL INTERFACE ERROR [HC]
Output check at IC1-4pin and 5pin/HC-14

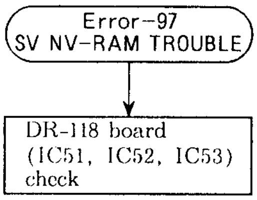

Error-92 TBC
INTERNAL SERIAL INTERFACE ERROR [TBC]
Output check at IC717-4pin and 5pin/TBC-18


Error−93 servo(main)
CPU INITIALIZE ERROR [servo(main)]
The clock pulse is normal at IC604-1pin/SS-48. (20 MHz, 3.1 Vp-p)
No
SS-48 board (X601, C628, C629, IC604-16pin, +5 V) check
Yes
The reset pulse is normal at IC604-21pin/SS-48 when the power is on.
No
IC4/SS-48 (reset pulse circuit) check
Yes
IC604/SS-48 check
+5 V
+4.3 V
IC604 −55pin
+5 V
IC604 −21pin
t
POWER ON
340 ms ≦ t ≦ 700 ms


Error−93 servo(sub)
CPU INITIALIZE ERROR [servo(sub)]
The clock pulse is normal at IC710-34pin/SS-48. (16 MHz, 4.2 Vp-p)
No
SS-48 board (X702, C713, C714, IC710-72pin +5 V) check
Yes
The reset pulse is normal at IC710-32pin/SS-48 when the power is on.
No
IC4/SS-48 (reset pulse circuit) check
Yes
IC710/SS-48 check
+5 V
+4.3 V
IC710 −72pin
+5 V
IC710 −32pin
t
POWER ON
340 ms ≦ t ≦ 700 ms


Error−93 time code
CPU INITIALIZE ERROR [time code]
The clock pulse is normal at IC403-33pin/SS-48. (8 MHz, 4.3 V p-p)
No
SS-48 board (X401, C405, C406, IC403-64pin, +5 V) check
Yes
The reset pulse is normal at IC403-22pin/SS-48 when the power is on.
No
IC4/SS-48 (reset pulse circuit) check
Yes
IC403/SS-48 check
+5 V
+4.3 V
IC403 -64pin
+5 V
IC403 -22pin
t
POWER ON
340 ms ≦ t ≦ 700 ms


Error−96
SY NV−RAM TROUBLE
Output check at IC1/HC-14


Error−97
SV NV−RAM TROUBLE
DR-118 board (IC51, IC52, IC53) check

2-4. PRINTED CIRCUIT BOARD

SYSTEM	BOARD	CIRCUIT FUNCTION
VIDEO	RP-57BP	RF PB Amplifier
	VP-33BP	Y/C PB Process (PB RF EQ, Demod, Encode, Y-RF Envelope DET), Composite Out Driver
	TBC-18P	Time Base Corrector, CTDM (Expand)
	CP-166A	Output Connector, Component Out Driver
AUDIO	AU-148AP	CH-1 PB Process, Dolby System
	AU-149AP	CH-2 PB Process, Dolby System
	AU-150A	Mode Control, LTC PB
	CP-167A	Output Connector, Line Out Driver
	DP-138B	Level Meter, Back Light
	VR-116B	PB Level Control, Headphone Volume Control
	MA-44B	Meter Driver,Headphone Amplifier
SERVO/ SYSTEM CONTROL/ TIME CODE	SS-48P	System Control, Servo System Main, Time Code Reader, Character Generator
	DT-29AP	Dynamic Tracking
	DT-30	Dynamic Tracking
	KY-210B	Keyboard
	DP-139B	Time Code Display
	DR-118A	Motor Driver, Solenoid Driver, Sensor Input, Tension Amplifier, FG Amplifier, CTL PB, Adjust Data Storage
	CL-25	Cassette Compartment (Cassette Loading Begin/Near-end Sensor, LP-57 Connection, Cassette loading Motor)
	DE-15	Reel FG
	DS-31	Condensation Sensor
	HC-14C	Sub-control Panel
	PC-62	Cassette In/Large Cassette Sensor
	PD-56	Pinch/Cleaning Solenoid Connection, Reel FG check
	PTC-39	Search Dial
	PTC-42	Cassette Size Sensor
	PTC-49	Threading Motor
	PTC-54	Threading FG
	PTC-55	Cassette Information Sensor (Tape Thickness, Reel Hub Diameter, Metal/Oxide)
	RM-82	Reel Motor
	RM-93A	TBC/9P Remote Connector
	SW-444B	Select Switch, Indicator, RF Level Meter
	TR-73	S/T Tension Sensor
OTHERS	AC-133	AC Line Filter, Fuse
	DP-159B	RF Meter Back Light
	LP-57	Cassette Illumination
	MB-322B	Mother Board

2-5. REMOVAL OF CABINET

Turn the POWER switch to OFF during removal.

Left Side Panel

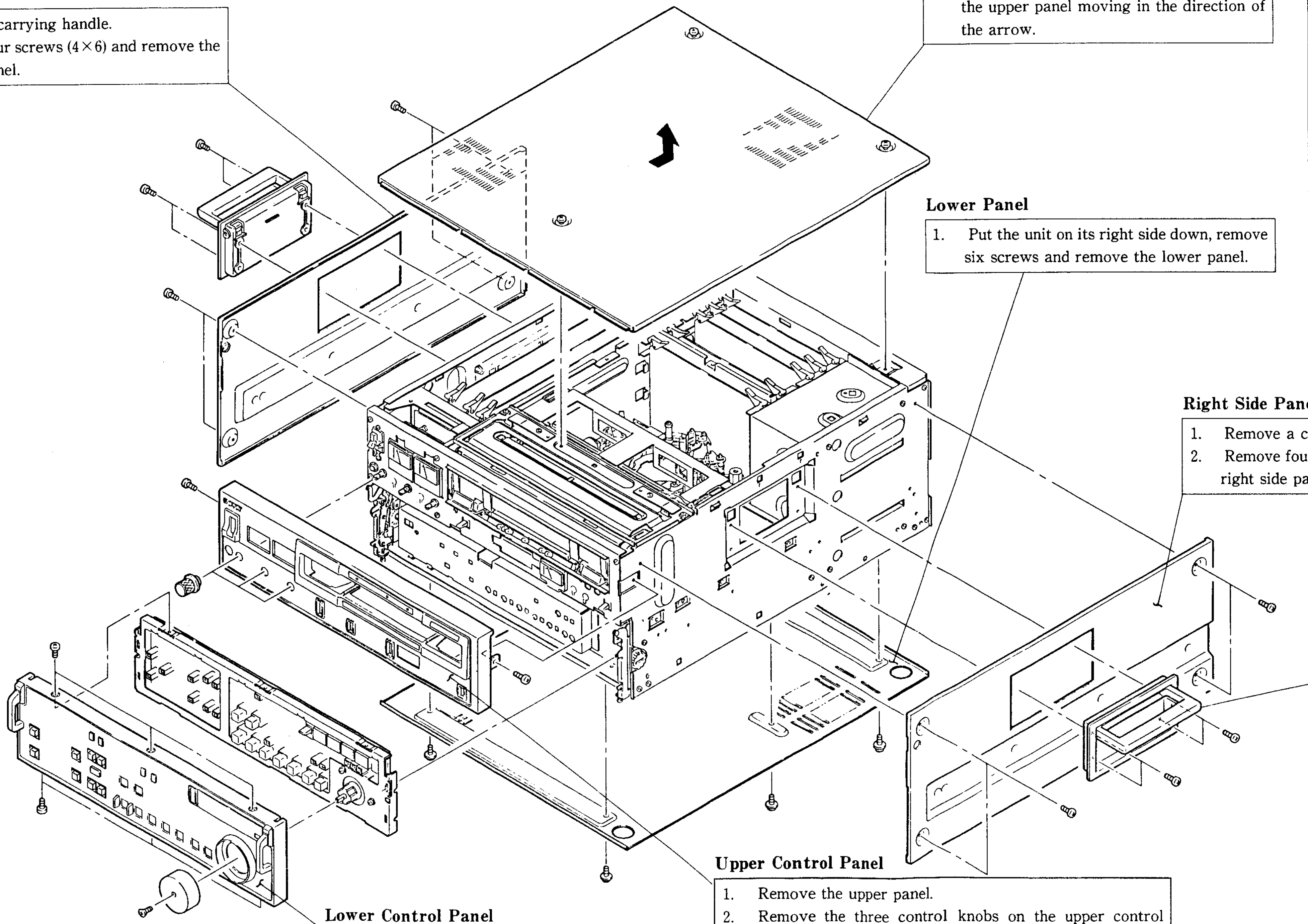
1. Remove a carrying handle.
2. Remove four screws (4×6) and remove the left side panel.

Upper Panel

1. Loosen three fixing screws, and remove the upper panel moving in the direction of the arrow.

Lower Panel

1. Put the unit on its right side down, remove six screws and remove the lower panel.



Right Side Panel

1. Remove a carrying handle.
2. Remove four screws (4×6) and remove the right side panel.

Carrying Handle

1. Remove four screws (3×6) and remove a carrying handle.

Lower Control Panel

1. Remove the lower control panel ass'y from the unit. (Refer to Section 2-8.)
2. Remove the each three screws (3×6) at the top and bottom on the lower control panel ass'y.
3. Remove the screw on the search dial (3×5) and remove the dial knob, then remove the lower control panel.

Upper Control Panel

1. Remove the upper panel.
2. Remove the three control knobs on the upper control panel.
3. Remove the each one screw (3×6) at the left and right of the upper control panel.
Insert your fingers in the space between the upper control panel and chassis, and remove the upper control panel as shown in figure 1.
4. When installing, insert the claws of the upper control panel into the lack of chassis, then fix the panel with the screws as shown in figure 2.

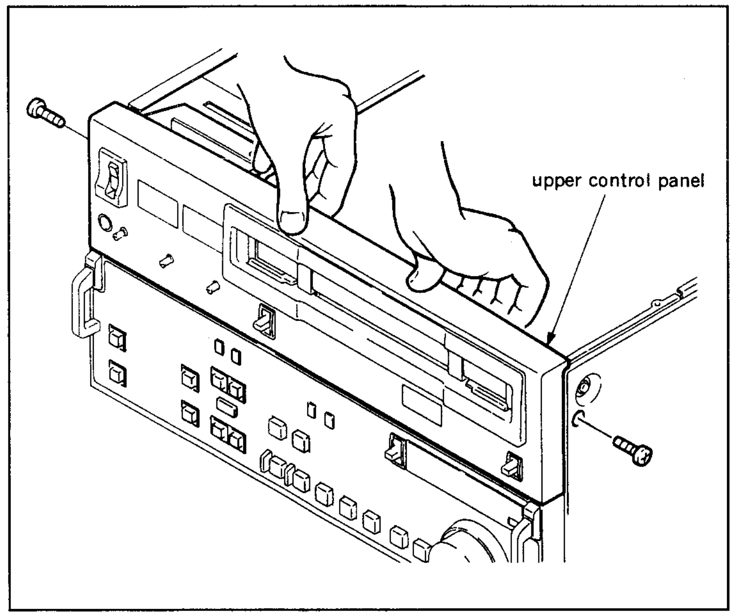


Figure 1

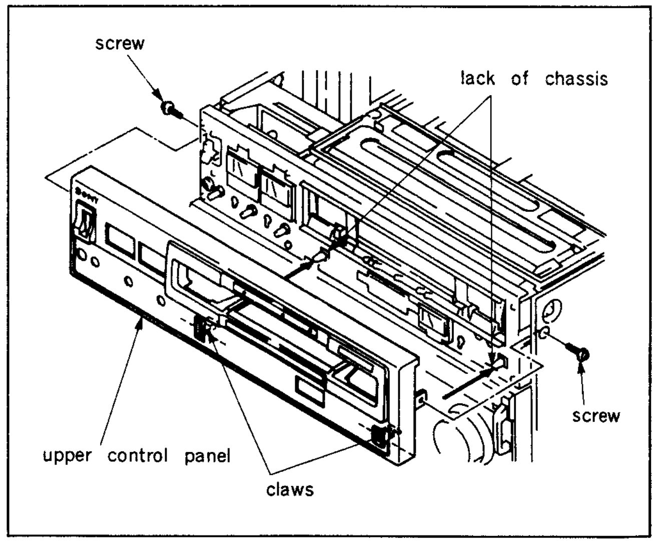
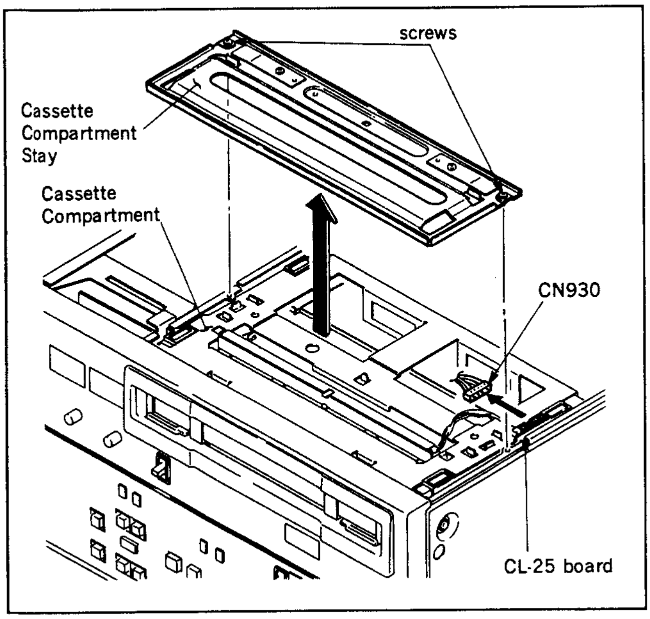


Figure 2

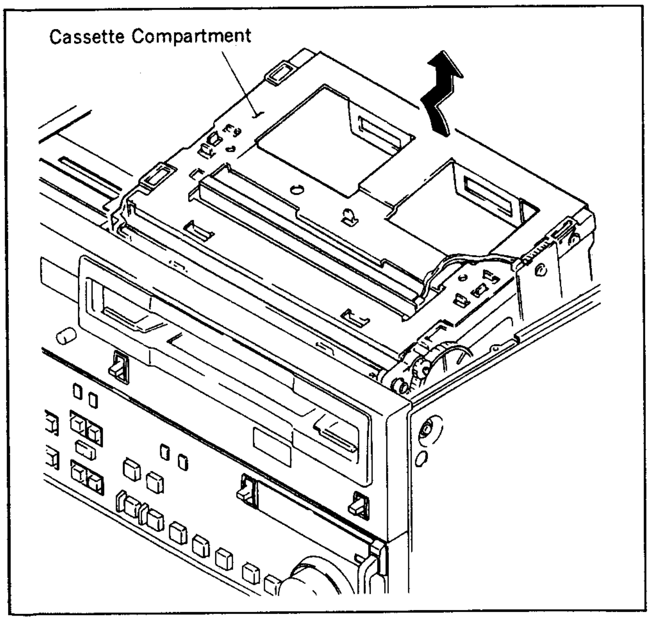
2-6. REMOVAL/INSTALLATION OF CASSETTE COMPARTMENT

• Removal

1. Turn the POWER OFF.
2. Loosen three screws and remove the upper panel. (Refer to Section 2-5.)
3. Loosen the two screws shown in the figure and remove the Cassette Compartment Stay.
   These screws are retained on the Stay, so they can not be gotton out of the Stay.
4. Disconnect connector CN930 on the CL-25 board at the upper right of the Cassette Compartment.

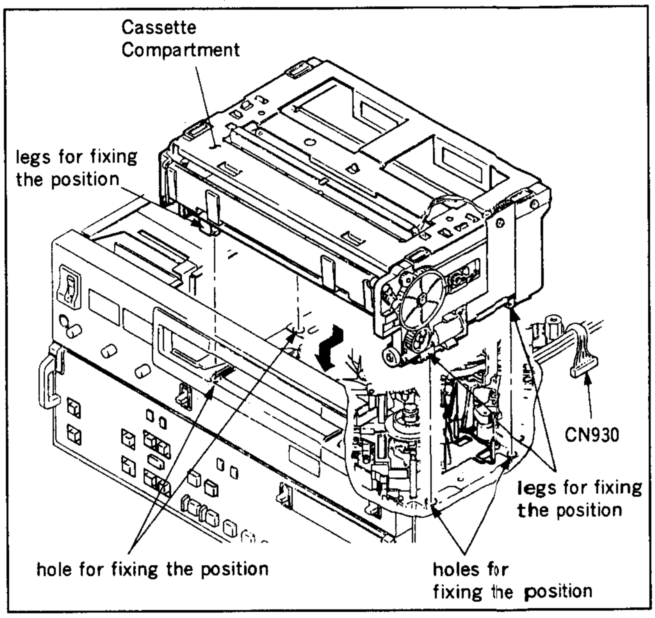

screws
Cassette Compartment Stay
Cassette Compartment
CN930
CL-25 board

5. Slide up the Cassette Compartment raising up the rear part as shown in the figure. Lift up the Cassette Compartment slowly.


Cassette Compartment

• Installation

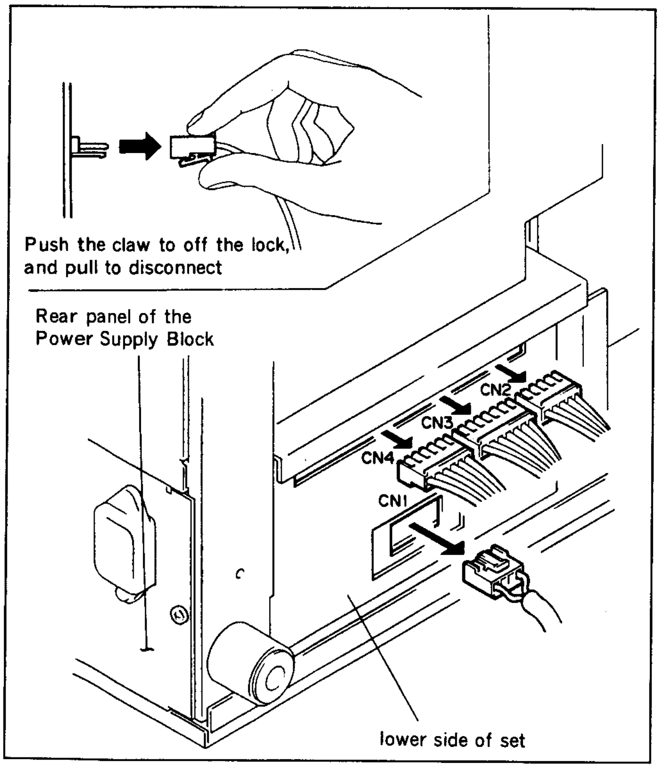
6. Set the harness of the connector(CN930) disconnected in step (4) so it is not put between chassis.
   Install the Cassette Compartment inserting slantingly in the direction as shown in the figure.
   (Note) In this time, confirm that the four legs of the Cassette Compartment for fixing the position are in the holes of the mechanical chassis for fixing the position.


Cassette Compartment
legs for fixing the position
CN930
legs for fixing the position
hole for fixing the position
holes for fixing the position

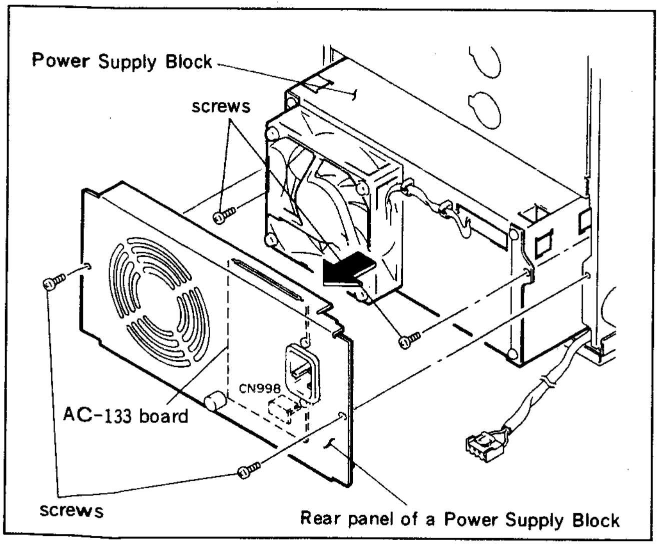
7. After confirming that the Cassette Compartment is fixed to the chassis, install the Cassette Compartment Stay and connect connector CN930 of the CL-25 board.

2-7. REMOVAL OF POWER SUPPLY BLOCK

1. Turn the POWER OFF.
2. Put the unit on its right side down and remove six screws and remove the lower panel.
3. Disconnect the four connectors(CN1, CN2, CN3, and CN4) shown in the figure.


Push the claw to off the lock, and pull to disconnect
Rear panel of the Power Supply Block
CN2
CN3
CN4
CN1
lower side of set

4. Remove the two screws at the top and bottom on the rear panel of the Power Supply Block and remove the rear panel.

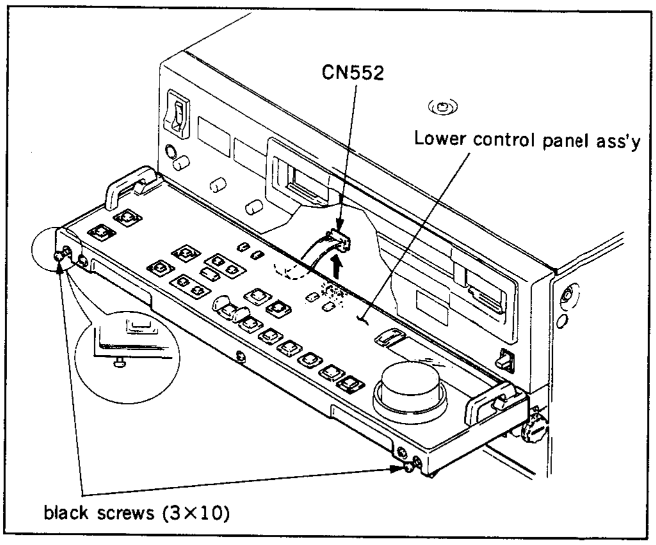

Power Supply Block
screws
CN998
AC-133 board
screws
Rear panel of a Power Supply Block

5. Disconnect connector CN998 on the AC-133 board.
6. Remove the two screws at the top and bottom diagonal and slide the Power Supply Block not to catch the harness, and remove the Power Supply Block.

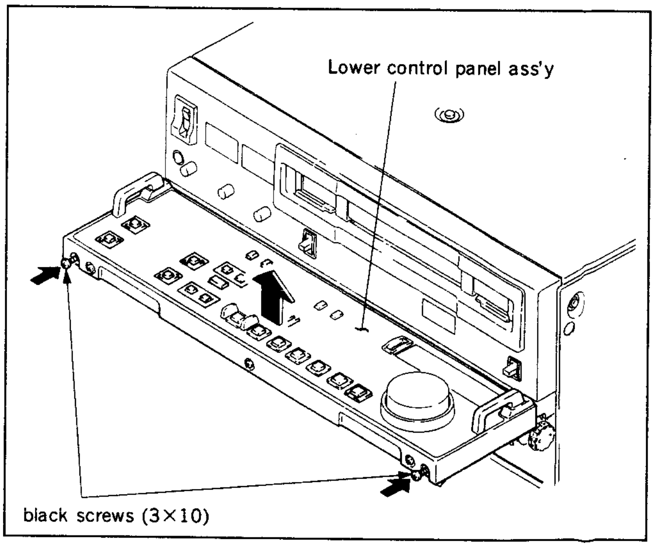
2-8. REMOVAL/INSTALLATION OF LOWER CONTROL PANEL ASS'Y

- **Removal**

1. Fix the lower control panel ass'y at 90 degrees (Refer to section 2-9.), disconnect connector CN552 on the HC-14 board of the sub control panel.
2. Loosen the two black screws (3×10) on the lower control panel ass'y shown in the figure. (Loosen the screws until screw's top are exposed from the lack of the lower control panel ass'y.)

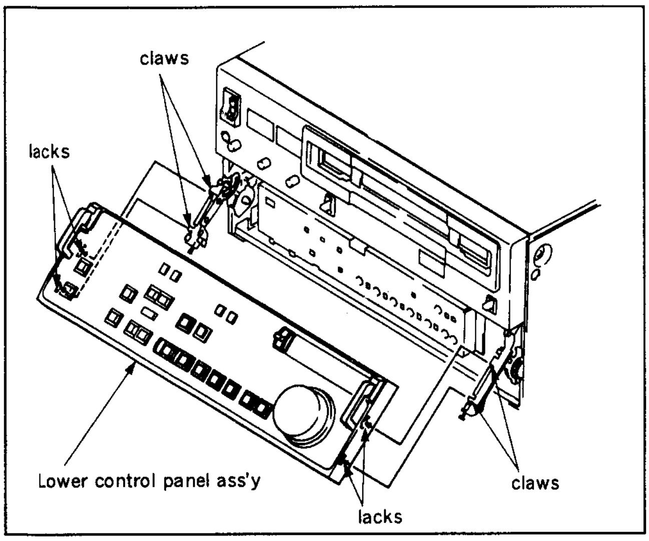

CN552
Lower control panel ass'y
black screws (3×10)

3. While pushing the loosen black screws in the direction of the arrow, remove the lower control panel ass'y from arms.


Lower control panel ass'y
black screws (3×10)

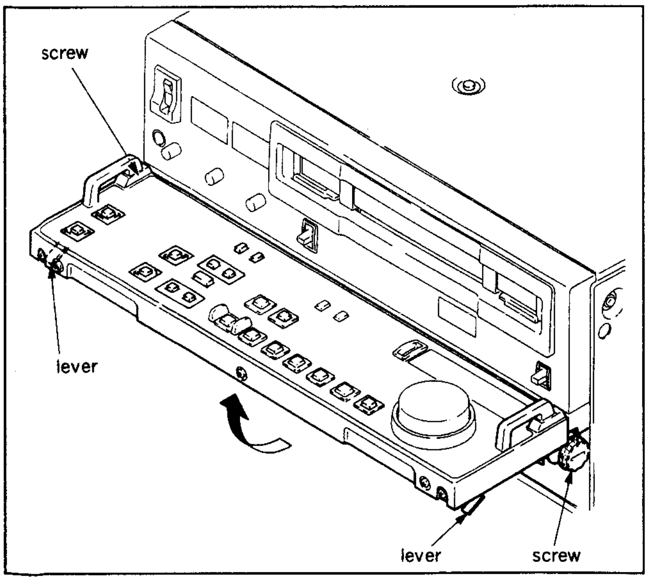
• Installation

4. Connect the harness of the lower control panel ass'y to connector CN552 on the HC-14 board of the sub control panel.
5. Fix the arms at 45 degrees, set the lacks of the lower control panel ass'y to the claws of the arms and insert the ass'y until you can hear the click.
   Then fix the ass'y with screws.



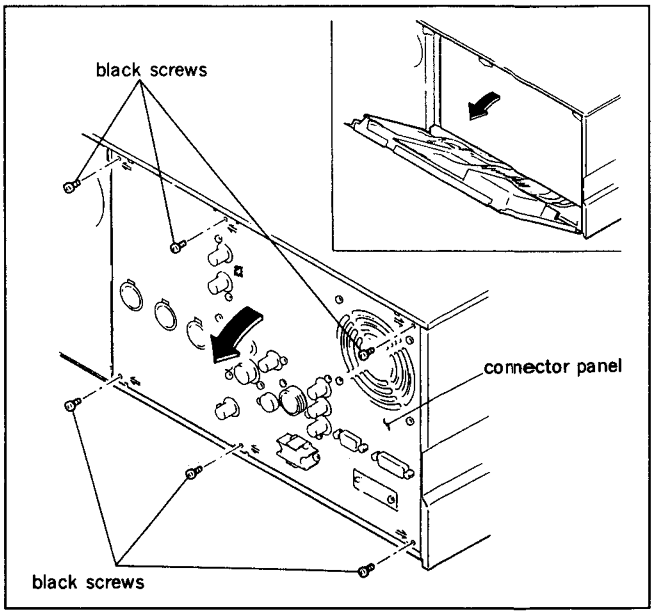
2-9. TILT THE LOWER CONTROL PANEL

1. Raise the panel to the desired angle.
2. While pressing the levers at the right and left sides of the panel, pull the panel up until it stops.
3. Tighten the screws on the right and left sides inside the panel by turning them clockwise.
4. While pressing the levers, lower the panel to the desired angle.
5. In case of change the angle, loosen the screws and try again from step1.



2-10. REMOVAL OF CONNECTOR PANEL

1. Turn the POWER OFF.
2. Remove the six screws indicated ⇨ at the top and bottom on the connector panel, then remove the connector panel not to stretch the harness as shown in the figure.



2-11. NOTE FOR CHECK AND MAINTENANCE OF PRINTED CIRCUIT BOARD

Be sure to turn the POWER OFF before removing or inserting the printed circuit boards.

2-12. EXTENSION BOARD

Two extension boards are supplied as optional accessory for check and adjustment of some printed circuit boards.
Insert the extension board into the chassis of the unit and connect the circuit board to be checked or adjusted to the end of the extension board.

Extension board	Connectable Printed Circuit Boards
EX-286 A-6766-389-A	VP-33, TBC-18, SS-48
EX-287 J-6338-130-A	AU-148, AU-149, AU-150, RP-57 DT-30

2-13. NOTES ON REPAIR PARTS

2-13-1. Notes on Repair Parts

(1) Safety Related Components Warning
Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Change of Parts
Regarding engineering parts changes, refer to Section 19 "CHANGED PARTS".

(4) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(5) Units for Capacitors and Resistors
The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.
Capacitors : μF
Resistors : Ω

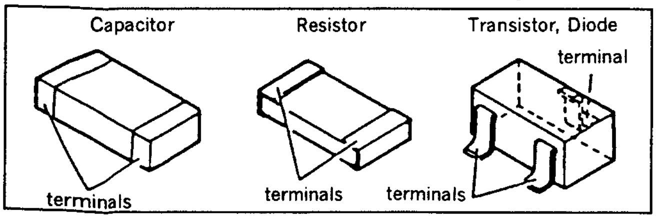
2-13-2. Replacement Procedure for Chip Parts

Required Tools

Soldering iron : 20 W If possible, use a soldering iron tip heat-controller at 270 ± 10 °C.
Braided wire : SOLDER TAUL or equivalent
Sony part No. 7-641-300-81
Solder : 0.6 mm dia. is recommended.
Tweezers

Soldering Conditions

Soldering iron temperature : 270 ± 10 °C.
Soldering time : less than two seconds per a pin.



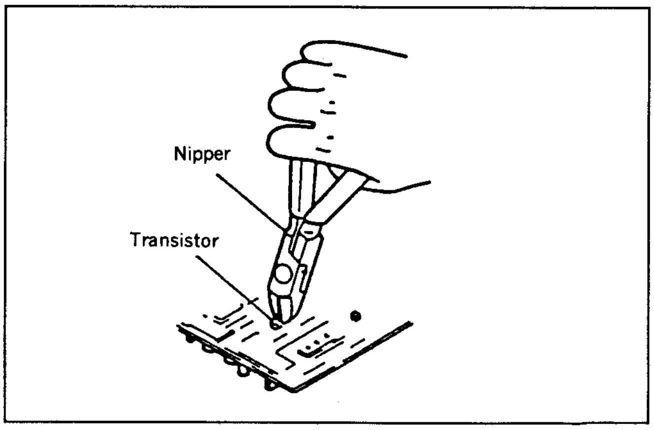
• Resistor and Capacitor Replacement

(1) Place the soldering iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
(2) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(3) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
(4) Place new chip part in the desired position and solder both ends.

NOTE: Once a chip part has been removed, never use it again.

• Transistor and Diode Replacement

(1) Cut the terminals of the chip part with a nipper.
(2) Remove the cut leads.
(3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
(5) Place new chip part in the desired position and solder the terminals.



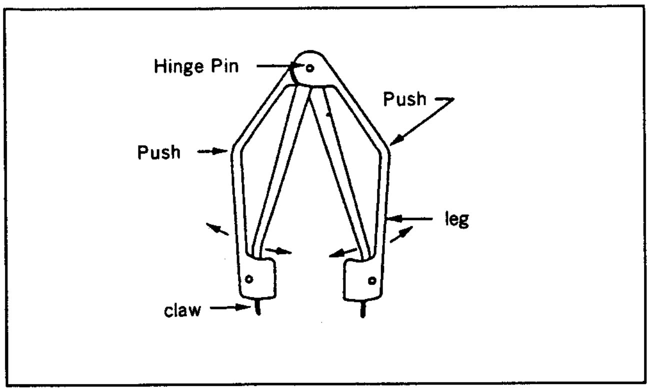
• IC Replacement

(1) Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
(2) While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
(3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
(4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
(5) Place new chip part in the desired position and solder the pins.

2-13-3. Removal of PLCC IC

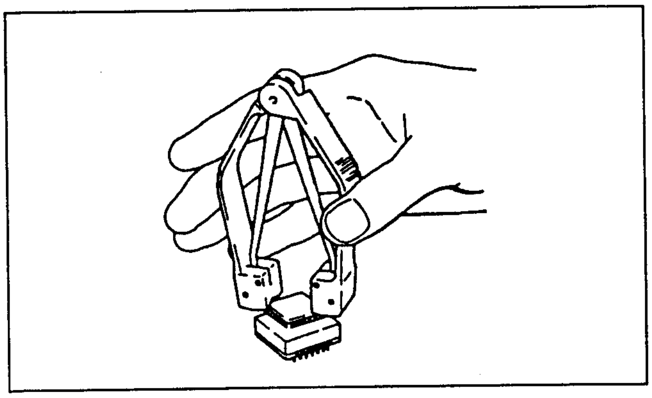
The Extraction Tool is useful for removing the IC (PLCC type) inserted into an IC socket. This is useful for all sizes of ICs of 20 pins through 124 pins.

Extraction Tool (for PLCC socket)
Sony Part No. J-6035-070-A

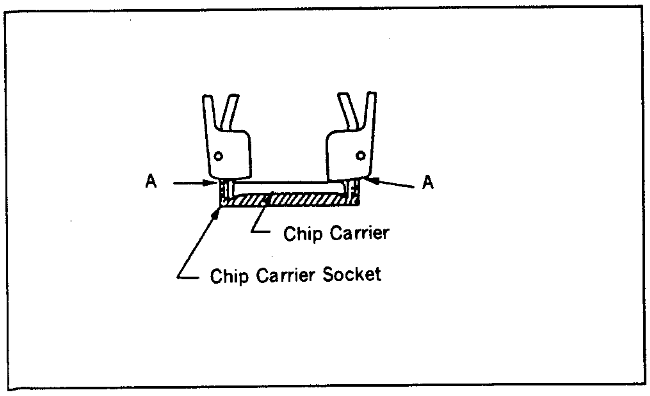

Hinge Pin
Push
Push
leg
claw

NOTE : • Never pull chips of IC upward with the Extraction Tool.
• Never hold the Extraction Tool on a strong force.

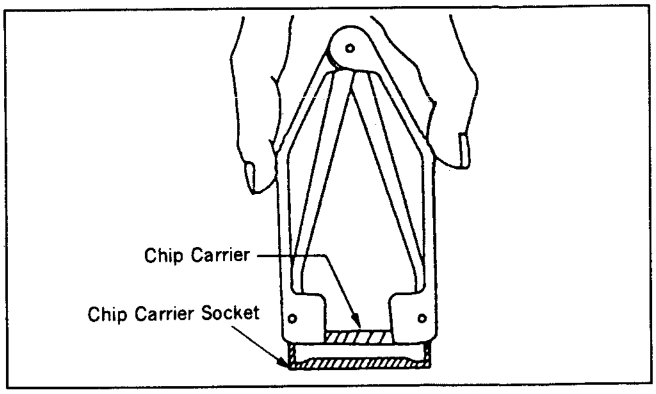
(1) Adjust width so that the claws of the tool are matched to the socket of an IC.



(2) Insert the claws of the tool into the slots of the socket, and then press the tool aginst the socket so that the A portion shown in the figure contact to the socket.


A
A
Chip Carrier
Chip Carrier Socket

(3) Hold the tool as shown in the figure. The socket is pressed on a little force to downward.


Chip Carrier
Chip Carrier Socket

(4) Pinch the tool, so the legs of the tool are straightened. At that time, the claws pinch the chips of the IC and pull the IC upward.

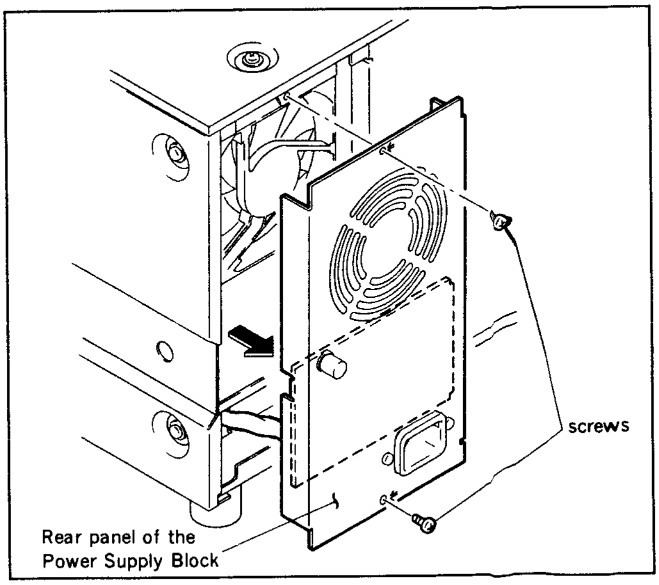
(5) After pulling the IC, loosen the force of the fingers, and take off the chip.

2-13-4. Replacement of Fuse

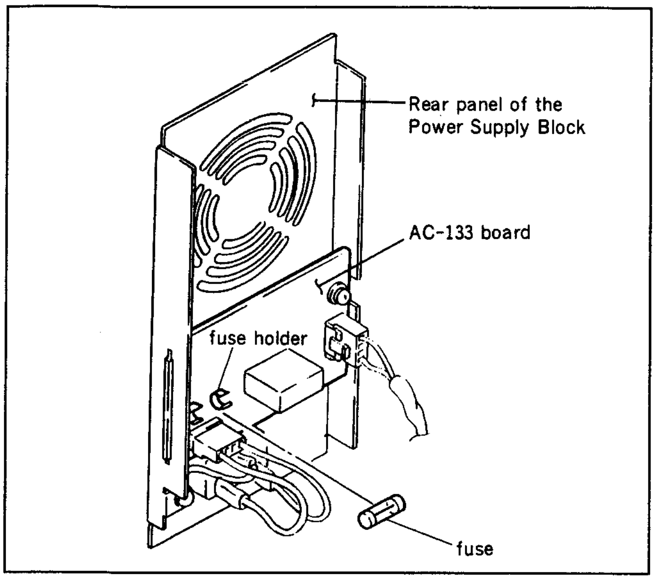
A power fuse is mounted on the AC-133 board. If the fuse has blown, first remedy cause of trouble, and replace the fuse.

(1) Turn the POWER OFF.

(2) Remove the two screws at the top and bottom on the rear panel of the Power Supply Block and remove the rear panel.


screws
Rear panel of the Power Supply Block

(3) Remove the fuse from the fuse holder on the AC-133 board, then replace the fuse.



2-14. HOW TO OPERATE THE UNIT WITHOUT CASSETTE TAPE

When some mechanical alignments are performed, it may be operated the unit without inserting a cassette tape.
The following procedures are described about the operation of the unit without installing the Cassette Compartment.

1. **Threading**
   Turn the POWER ON.
   After the reel motor and upper drum are rotated, the supply tension arm, take-up tension arm, supply slider, take-up slider and pinch roller slider begin to move, and the unit is put into threading mode.
   The tension arm and three sliders move to the regular positions, and threading is completed.
   It is said that this threading completed state is STOP mode.

2. **Playback**
   Set the setup menu "Item 902" to 1. (At this time, tape protection mode is off.)
   Press the PLAY button in threading completed state. A pinch roller is pressed to the capstan shaft, and the unit is put into PLAY mode.
   If the PLAY button is pressed during the threading, the pinch roller is pressed to a capstan shaft after threading is completed, and the unit is put into PLAY mode.
   NOTE : After adjustment is completed, set the setup menu "Item 902" to 0.

3. **Unthreading**
   Press the EJECT button in threading completed state. A supply slider, take-up slider and pinch roller slider begin to move, and the unit is put into unthreading mode.
   Three sliders move to the regular positions, and unthreading is completed.

4. **Search**
   Set the setup menu "Item 902" to 1. (At this time, tape protection mode is off.)
   Rotate a search dial to forward or reverse direction in threading completed state. A pinch roller is pressed to a capstan shaft, and the unit is put into search mode in the direction and the speed decided by the search dial.
   If setup menu "Item 101" is set to 1, press the SEARCH button and rotate the search dial in threading completed state. Then the unit is put into search mode.
   NOTE : After adjustment is completed, set the setup menu "Item 902" to 0.

5. **Fast forward and rewind**

Set the setup menu "Item 902" to 1. (At this time, tape protection mode is off.)

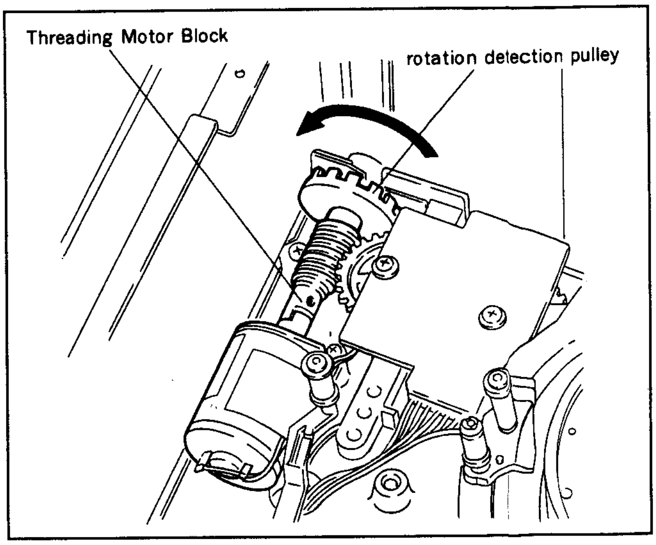
Press the F.FWD button or REW button in threading completed state. Then the unit is put into fast foward or rewind mode.

NOTE : After adjustment is completed, set the setup menu "Item 902" to 0.

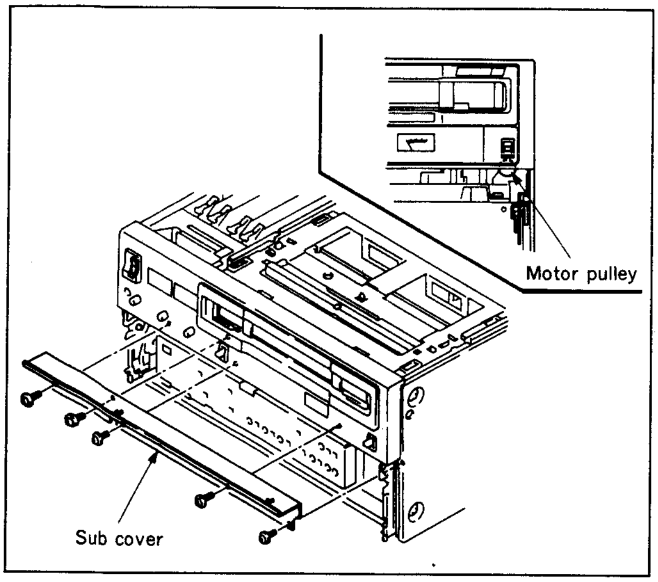
2-15. TAKE OUT THE CASSETTE TAPE IN SLACKING

When the tape in the unit is slacked, take out the cassette tape by the following procedures carefully so that the tape is not damaged.

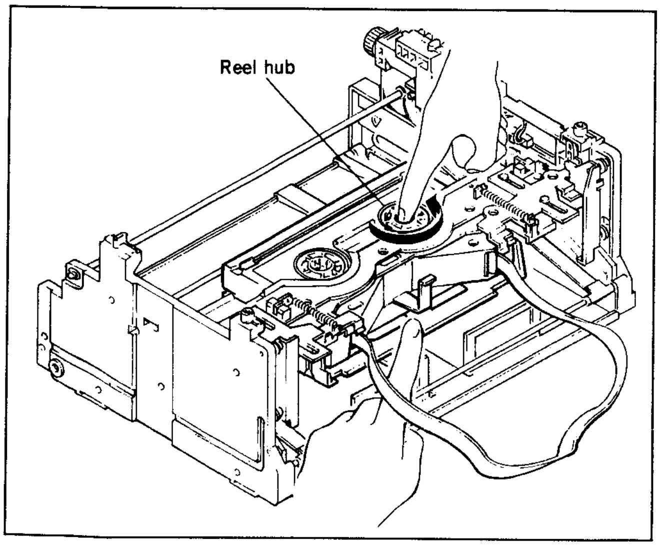
1. Turn the POWER OFF.
2. Remove the upper panel. (Refer to Section 2-5.)
3. Turn the rotation detection pulley of the Threading Motor Block counterclockwise until the supply tension arm, take-up tension arm, supply slider, take-up slider and pinch roller slider are threading completed state.



4. Remove the Cassette Compartment Stay. (Refer to Section 2-6.)
5. Disconnect connector CN930 on the CL-25 board of the Cassette Compartment. (Refer to Section 2-6.)
6. Remove the lower control panel ass'y. (Refer to Section 2-8.)
7. Remove the sub cover.
8. Turn the motor pulley shown in the figure in the direction of the arrow.



9. While holding the cassette lid by hand to prevent it closing so that the cassette compartment moves up. (Stop rotating the pulley just before the cassette compartment begin to moves to the surface.)
10. Take out the cassette compartment slowly from the unit while holding the cassette lid.
11. Wind the tape into the cassette by turning the reel hub with a finger and close the cassette lid.



12. Remove the cassette tape from the cassette compartment.
13. Turn the pulley described in Step 8 so that the stage of the cassette compartment moves the cassette out position.
14. Install the cassette compartment to the unit.
15. Connect the connector (CN930), then install the Cassette Compartment Stay.

NOTE : Locate the cause of the trouble and remedy the problem, before the POWER switch is turned ON.

2-16. CLEANING WHEN HEADS CLOGGED

If the video head is clogged, clean the head as the following procedures.

- **Cleaning by cleaning tape**

1. Insert the cleaning tape BCT-5CLN in the unit, and press the PLAY button at once.
   NOTE :
   - Make sure to use the cleaning tape BCT-5CLN. If the cleaning is performed by other cleaning tape, not the BCT-5CLN, unusual friction or damage of the video head may occurred.
   - Press the PLAY button immediately after inserting the cleaning tape BCT-5CLN in the unit.
2. After using the cleaning tape in play mode for 5 seconds, press the EJECT button.
   NOTE :
   - Make sure to press the EJECT button not STOP button.
   - Do not put the unit in play mode more than 5 seconds.
   - Do not use the cleaning tape with rewind.
3. Confirm that the head clog is clear.
   If the video head is clogged after Step 2, clean the video head as following procedure.

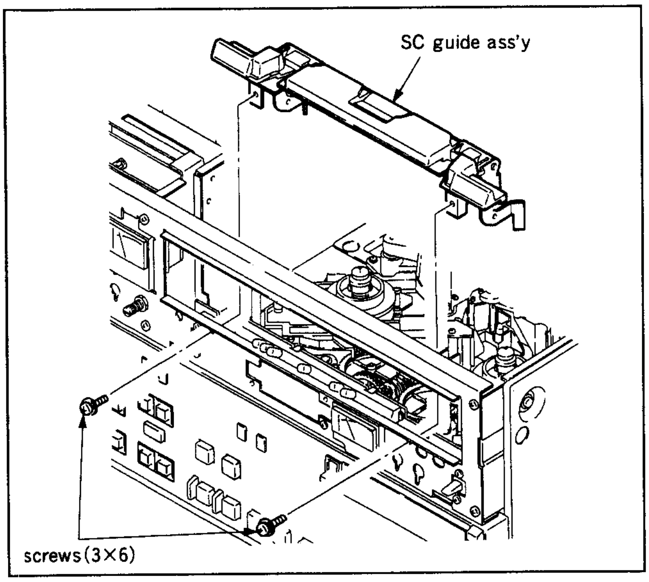
- **Cleaning by cleaning piece**

1. Touch the head lightly with a cleaning piece moistened with cleaning fluid.
2. Slowly rotate the upper drum in the direction of head's rotation with a finger and clean the video head.
   NOTE :
   - Do not move the cleaning piece in a vertical direction. This will damage the video head.
   - Be sure to turn the POWER ON, when cleaning is performed.

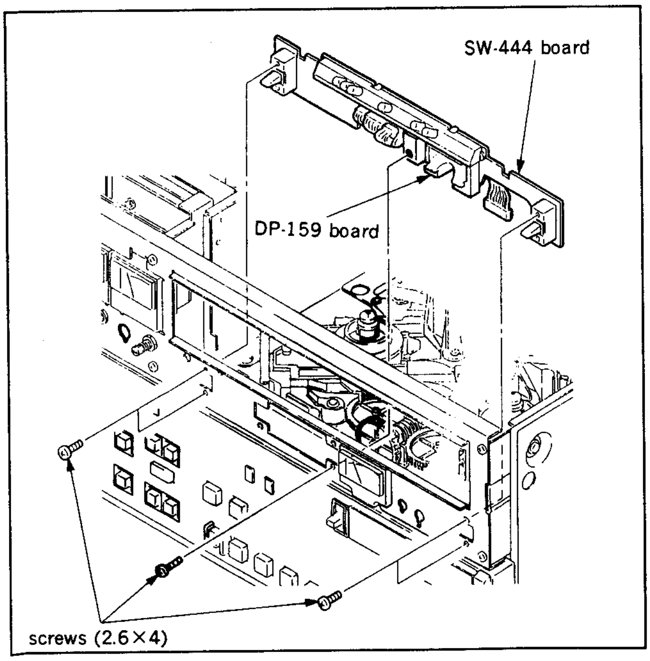
2-17. REPLACEMENT OF BOARDS

2-17-1. SW-444 Board

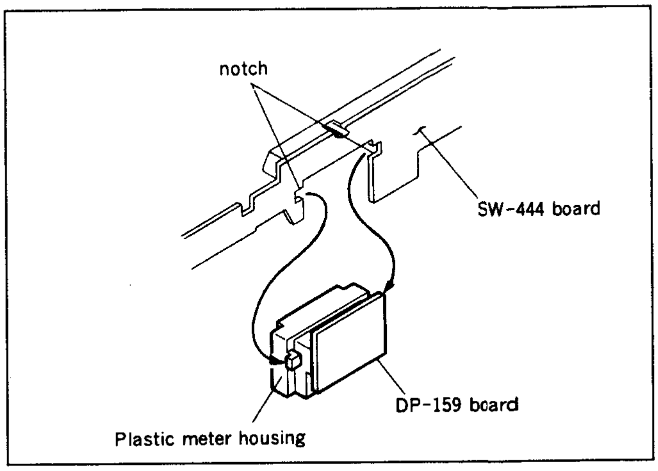
(1) Turn the POWER OFF.
(2) Loosen three screws and remove the upper panel. (Refer to Section 2-5.)
(3) Remove three control knobs and two screws and remove the upper control panel. (Refer to Section 2-5.)
(4) Remove the Cassette Compartment. (Refer to Section 2-6.)
(5) Remove the two screws (3×6) shown in the figure and remove the SC guide ass'y.


SC guide ass'y
screws(3×6)

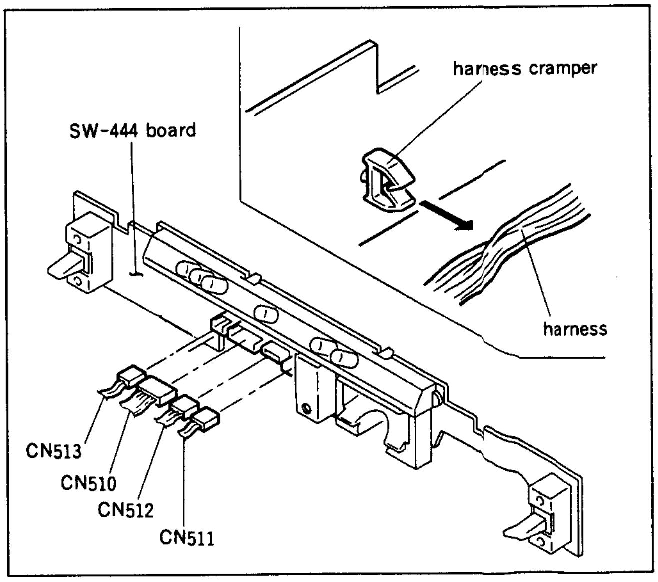
(6) Remove the five screws (2.6×4) shown in the figure and remove the SW-444/DP-159 boards.


SW-444 board
DP-159 board
screws (2.6×4)

(7) Pull off the plastic meter housing of the DP-159 board from the notch of the SW-444 board.


notch
SW-444 board
DP-159 board
Plastic meter housing

(8) Disconnect the four connectors(CN510, CN511, CN512 and CN513) of the SW-444 board.


harness cramper
SW-444 board
harness
CN513
CN510
CN512
CN511

(9) Remove the harness from the cramper and remove the SW-444 board.

2-17-2. MA-44 Board

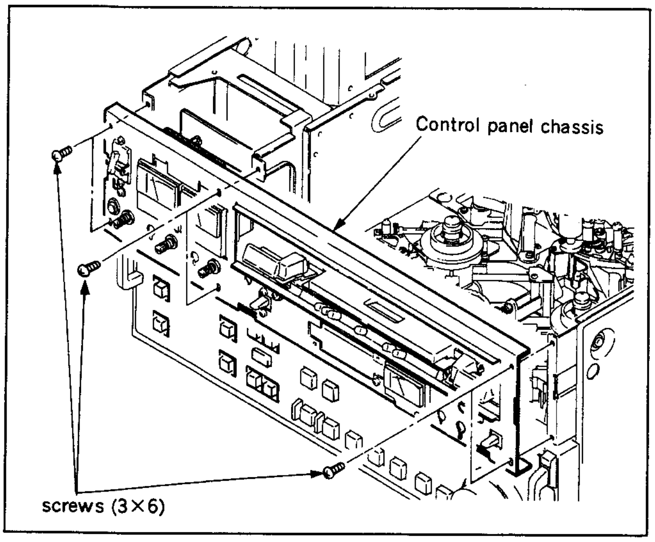
• Removal

(1) Turn the POWER OFF.

(2) Loosen three screws and remove the upper panel. (Refer to Section 2-5.)

(3) Remove three control knobs and two screws and remove the upper control panel. (Refer to Section 2-5.)

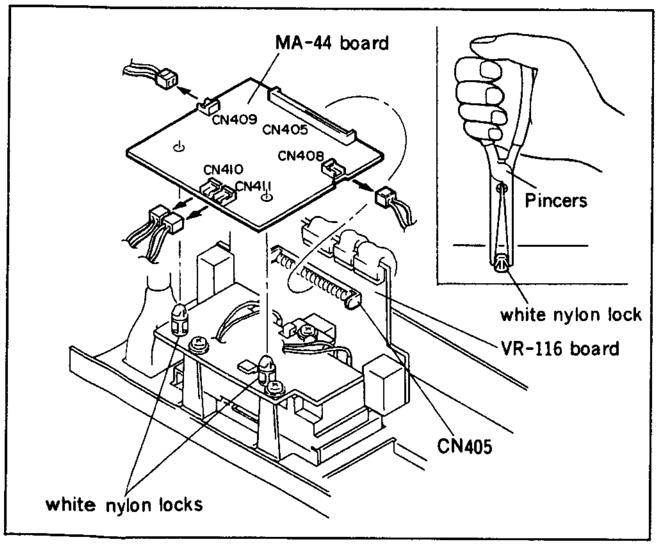
(4) Remove the six screws (3×6) shown in the figure and remove the control panel chassis.


Control panel chassis
screws (3X6)

(5) Disconnect the four connectors (CN408, CN409, CN410 and CN411) of the MA-44 board.

(6) Push and remove the white nylon locks fixing the MA-44 board with a pincers from the board.

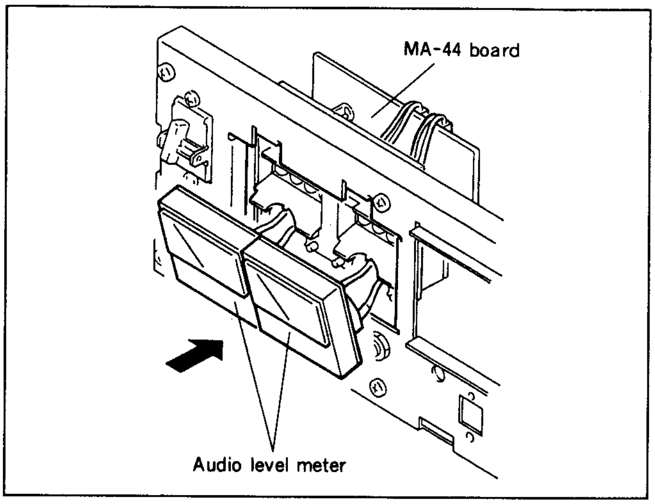
(7) Disconnect the connector (CN405) connected to the VR-116 board and remove the MA-44 board.


MA-44 board
CN409
CN405
CN408
CN410
CN411
Pincers
white nylon lock
VR-116 board
CN405
white nylon locks

• Installation

(8) Connect the MA-44 board to the connector (CN405) of the VR-116 board and insert the white nylon locks to the board.

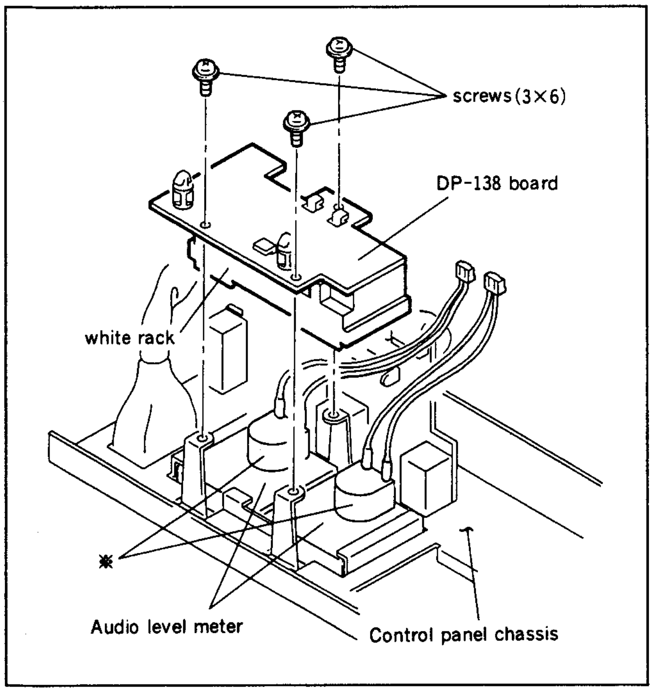
(9) Connect the four connectors (CN408, CN409, CN410 and CN411) and push two audio level meters into the chassis from the control panel side.


MA-44 board
Audio level meter

2-17-3. DP-138 Board

- **Removal**

(1) Turn the POWER OFF.
(2) Loosen three screws and remove the upper panel. (Refer to Section 2-5.)
(3) Remove three control knobs and two screws and remove the upper control panel. (Refer to Section 2-5.)
(4) Remove six screws and the control panel chassis and remove the MA-44 board. (Refer to Section 2-17-2.)
(5) Remove the three screws of the DP-138 board and remove the board.

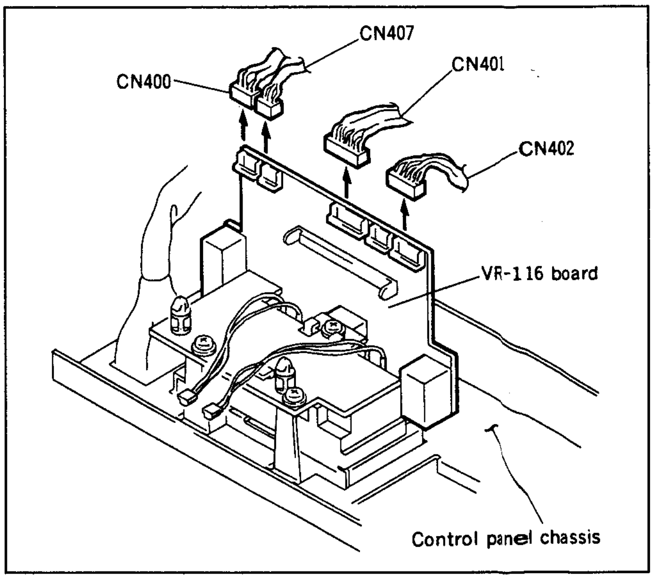

screws(3×6)
DP-138 board
white rack
※
Audio level meter
Control panel chassis

- **Installation**

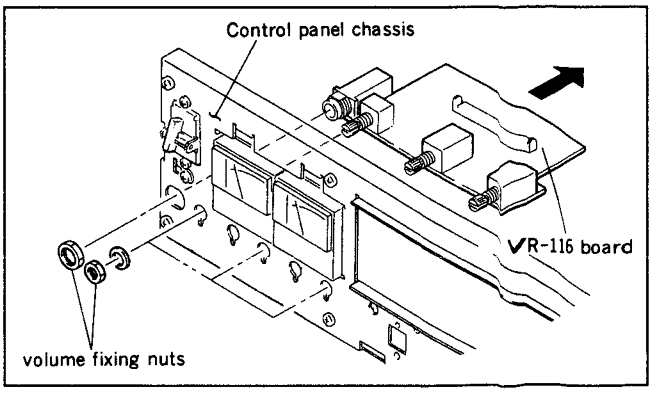
(6) Set the white rack of the DP-138 board and ※ portion of the audio level meters as shown in the figure above and fasten the DP-138 board by the screws.
(7) Install the MA-44 board and connect the four connectors (CN408, CN409, CN410 and CN411).
(8) Push the audio level meters into the chassis from the control panel side.

2-17-4. VR-116 Board

(1) Turn the POWER OFF.
(2) Loosen three screws and remove the upper panel. (Refer to Section 2-5.)
(3) Remove three control knobs and two screws and remove the upper control panel. (Refer to Section 2-5.)
(4) Remove six screws and the control panel chassis and remove the MA-44 board. (Refer to Section 2-17-2.)
(5) Disconnect the four connectors (CN400, CN401, CN402, and CN407) of the VR-116 board.

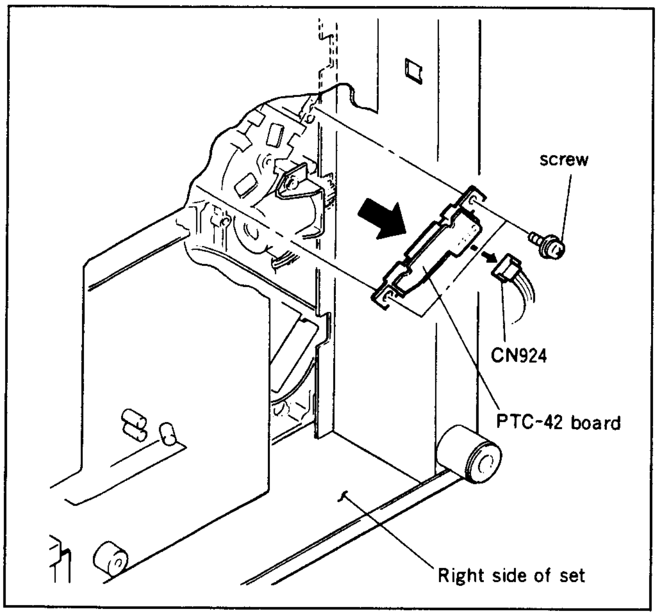

CN407
CN400
CN401
CN402
VR-116 board
Control panel chassis

(6) Remove four volume fixing nuts from the control panel side and remove the VR-116 board.


Control panel chassis
VR-116 board
volume fixing nuts

2-17-5. PTC-42 Board

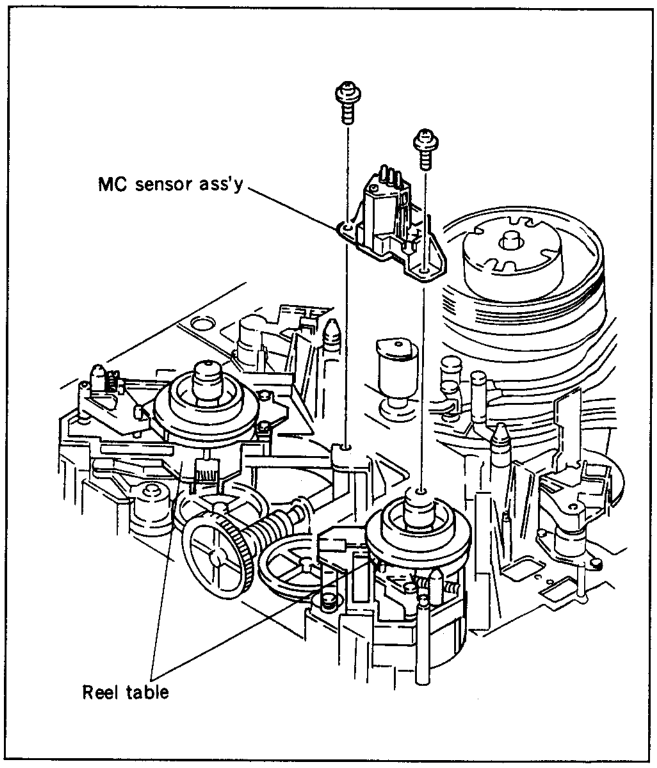
(1) Turn the POWER OFF.
(2) Put the unit right side down and remove six screws and remove the lower panel.
(3) Remove two screws and remove the PTC-42 board.
(4) Disconnect connector CN924.


screw
CN924
PTC-42 board
Right side of set

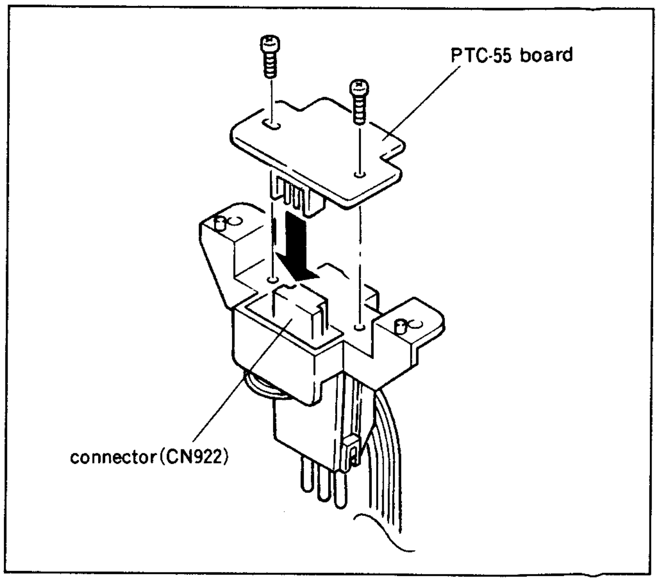
2-18. REMOVAL/INSTALLATION OF DETECTION SWITCH

2-18-1. Removal of MC Sensor

1. Remove the Cassette Compartment. (Refer to Section 2-6.)
2. Position the reel table at the center or large cassette position.
3. Remove the two screws shown in the figure and remove the MC sensor ass'y.


MC sensor ass'y
Reel table

4. Remove the two screws from the reverse side of the MC sensor ass'y and remove the PTC-55 board.
5. Disconnect the connector CN922 on the PTC-55 board.


PTC-55 board
connector(CN922)

2-19. PRECAUTION IN REPLACEMENT OF DR-118 BOARD

NOVRAM CXK1013P (IC51, IC52 and IC53) are mounted on the DR-118 board to save the data of servo system adjustment.

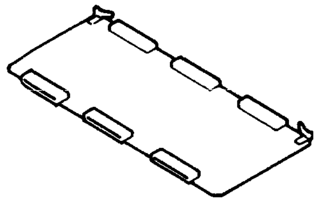
When the DR-118 board is replaced, pull out the NOVRAM (IC51, IC52 and IC53) and mount them on the new DR-118 board.

If not mounting them to the new board, servo system may not be operated normally.

NOTE : The IC51, 52 and 53 are not mounted on the boards which are in stock as service parts.

2-20. FIXTURE

Fig. No	Part No.	Description	For Use
1	A-6766-389-A	Extension Board (L), EX-286	VP-33, TBC-18, SS-48 Board extension
2	J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
3	J-6001-830-A	Drum Eccentricity Gauge (2)	
4	J-6001-840-A	Drum Eccentricity Gauge (1)	
5	J-6031-830-A	Multi Connector Cable (DOBNC)	Video adjustment (Connector DUB OUT)
6	J-6035-070-A	Extraction Tool (for PLCC socket)	Extraction of IC (PLCC type)
7	J-6080-008-A	Cassette Reference Plate	Reel table height adjustment
8	J-6080-011-A	Reel Table Tension Gauge	Brake torque adjustment
9	J-6080-029-A	Adjustment Mirror	
10	J-6080-840-A	Adjustment Mirror	Tape path adjustment
11	J-6086-570-A	Reference Flat Plate	Audio/TC head slantness adjustment
12	J-6087-000-A	Drum Eccentricity Gauge (5)	Upper drum eccentricity adjustment
13	J-6320-870-A	Reel Motor Shaft Slantness Check Fixture	Reel motor shaft slantness check and adjustment
14	J-6152-450-A	Wire Clearance Check Gauge	Clearance check
15	J-6320-680-A	Reel Table Height Gauge	Reel table height adjustment
16	J-6320-880-A	Cassette Base Plate (L)	Reel table height adjustment
17	J-6321-500-A	Tape Guide Adjustment Driver	Tape guide height adjustment
18	J-6322-370-A	Tension Regulator Position Adjustment Fixture	Tension regulator position adjustment
19	J-6325-530-A	Drum Eccentricity Gauge (6)	Upper drum eccentricity adjustment
20	J-6327-850-A	Dial Tension Gauge	Measuring torques
21	J-6327-930-A	Tension Measurement Tape	Tension arm sensitivity/position adjustment
23	J-6338-130-A	Extension Board (S), EX-287	AU-148, AU-149, AU-150, RP-57, DT-30 Board extension
24	2-034-697-00	Cleaning Piece	Cleaning
25	7-661-018-18	Oil	
26	7-662-001-41	Molyton Grease, No.320 (30 g Bottle)	
27	7-662-010-04	Grease, SGL-505 (20 g)	
28	7-700-736-01	L-Shaped Hexagonal Wrench (d : 1.27 mm)	
29	7-700-736-05	L-Shaped Hexagonal Wrench (d : 1.5 mm)	
30	7-700-736-06	L-Shaped Hexagonal Wrench (d : 0.89 mm)	
31	7-732-050-20	Tension Scale (50 g full scale)	Tension adjustment
32	7-732-050-30	Tension Scale (100 g full scale)	
33	8-960-096-51	Alignment Tape, CR2-1B PS	Servo and Tracking alignments (metal particle tape)
34	8-960-096-86	Alignment Tape, CR8-1B PS	Audio alignment (oxide tape)
35	8-960-096-91	Alignment Tape, CR5-1B PS	Video and Audio alignments (metal particle tape)
36	8-960-098-44	Alignment Tape, CR5-2A PS	Video, Servo and Power Supply/System Control alignments (oxide tape)
37	8-960-098-45	Alignment Tape, CR8-1A PS	Audio alignment (oxide tape)
38	9-911-053-00	Thickness Gauge	Clearance check
39	9-919-573-01	Cleaning Fluid	Cleaning
40	standard product	TENTELOMETER (T2-H7-UMC)	Back tension adjustment

①


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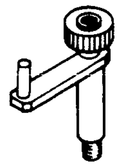

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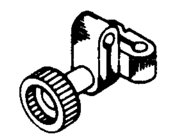

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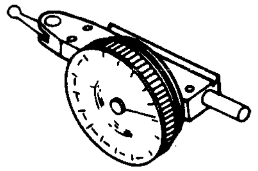

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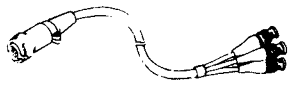

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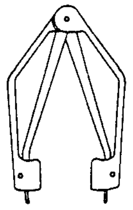

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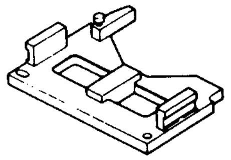

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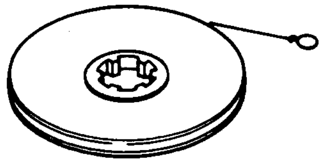

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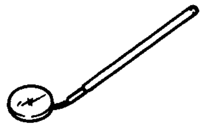

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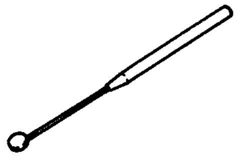

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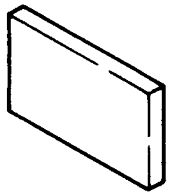

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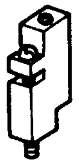

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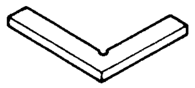

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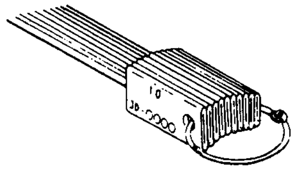

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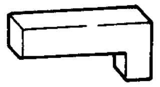

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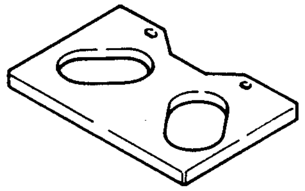

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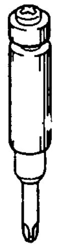

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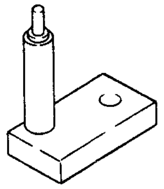

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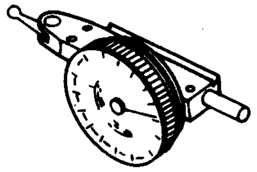

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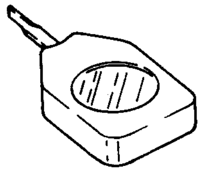

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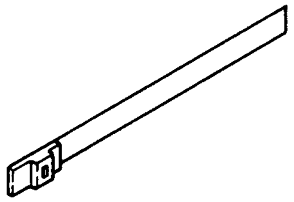

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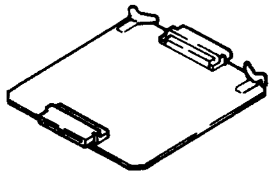

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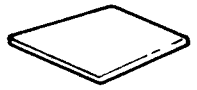

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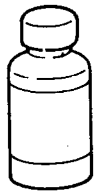

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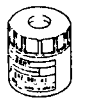

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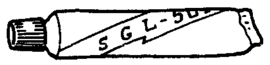

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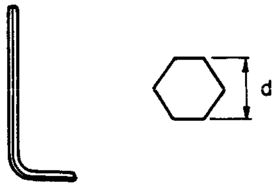

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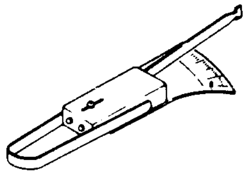

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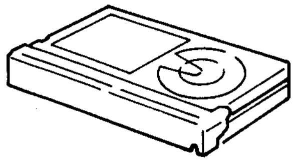

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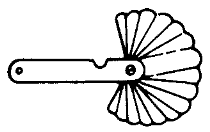

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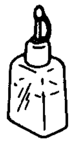

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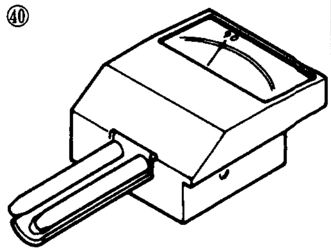

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2-21. INTRODUCTION TO CIRCUIT

2-21-1. Outline of The Betacam Method

The Betacam recording method was developed for the purpose of ENG (Electronic News Gathering) and EFP (Electronic Field Production). Therefore, the primary object of its development is to make it compact and to have good quality of portrait enough to use broadcast.

As for recording system, all processes are disposed as component signal. Consequently, composite input signals are replaced as Y, B-Y or R-Y and disposed.
The process is shown as fig.1. After A/D converting, the input signals are separated as Y/C, converted as component signal at decoder. The converted each signal is send to process of luminance signal (Y) system, B-Y and R-Y send to process of chroma signal (C) system. After that, Y-signal which added synchronized signal is FM-modulated and recorded at Y-R/P head. On the other side, chroma signal add B-Y and CFID (Color Framing ID), and is time-compressed to record within the time of 1H. The process is read back alternately R-Y by the double-pulsed clock of memory-write, then time-compressed to half. This compressed signal is called CTDM signal. The chroma signal resulted in CTDM signal is FM-modulated after phase adjustment with Y signal, recorded at C-R/P head.

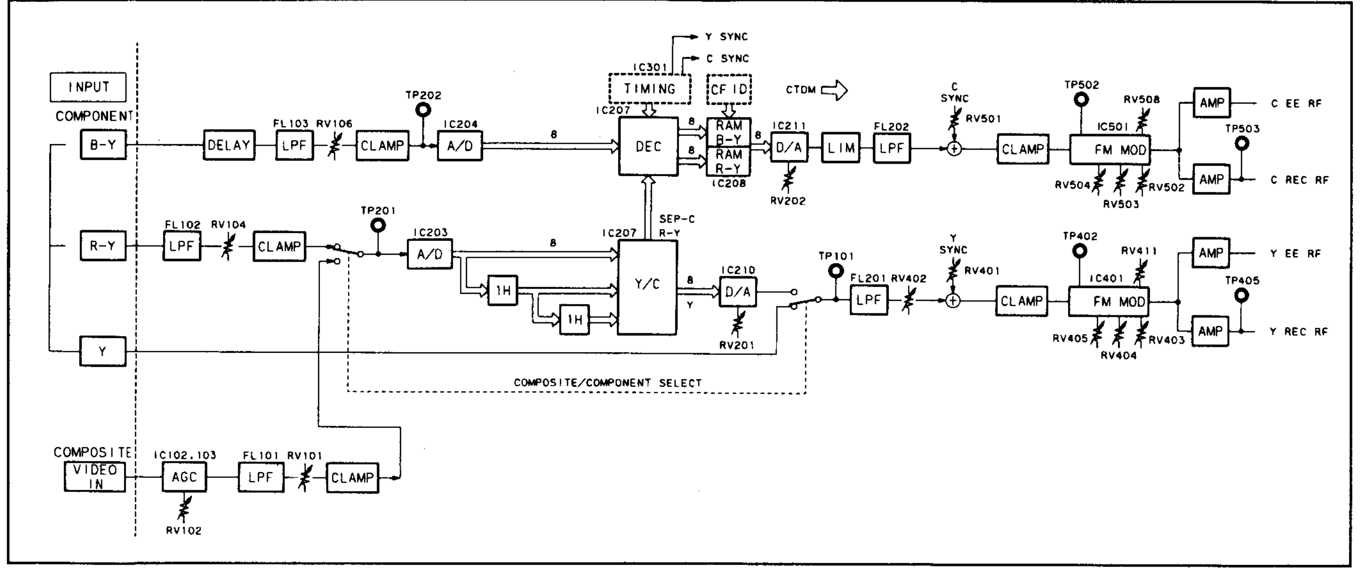

Y SYNC
C SYNC
IC301
TIMING
CF ID
CTDM
INPUT
COMPONENT
B-Y
R-Y
Y
DELAY
FL103 RV106
LPF
CLAMP
TP202
IC204
A/D
8
IC207
DEC
RAM B-Y
RAM R-Y
IC208
IC211
D/A
RV202
LIM
FL202
LPF
C SYNC
RV501
CLAMP
TP502
RV508
IC501
FM MOD
RV504
RV503
RV502
AMP
C EE RF
TP503
C REC RF
FL102 RV104
TP201
IC203
SEP-C R-Y
1H
Y/C
IC210
RV201
TP101
FL201 RV402
Y SYNC
RV401
TP402
RV411
IC401
RV405
RV404
RV403
Y EE RF
TP405
Y REC RF
COMPOSITE/COMPONENT SELECT
COMPOSITE
VIDEO IN
IC102,103
AGC
RV102
FL101 RV101

Fig. 1

As shown in fig.2, Y signal and CTDM chroma signal are recorded on respective track at R/P head of each Y/C at the same time.

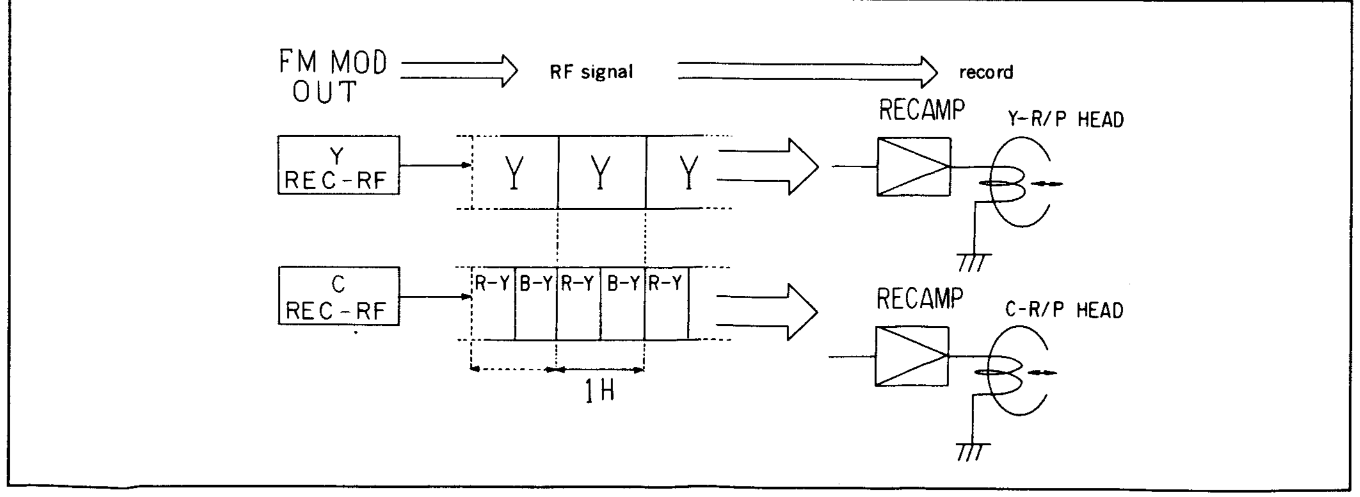
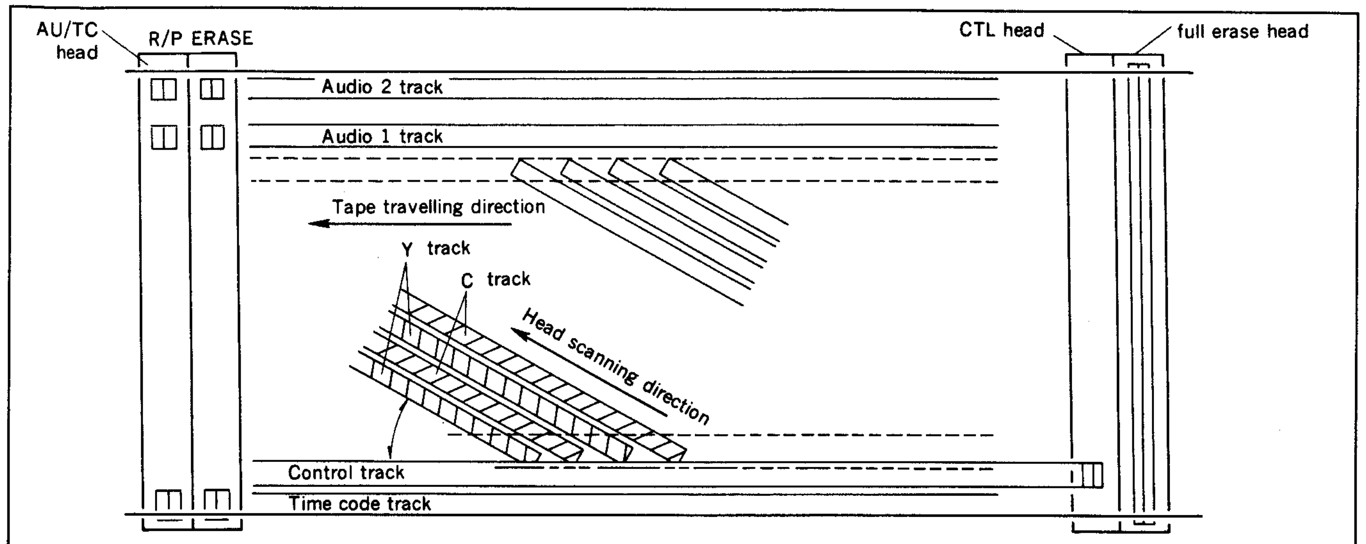

FM MOD OUT
RF signal
record
RECAMP
Y-R/P HEAD
Y REC-RF
Y
Y
Y
C REC-RF
R-Y
B-Y
R-Y
B-Y
R-Y
1H
RECAMP
C-R/P HEAD

Fig. 2

The Betacam recording pattern that 2CH of audio, Time code (LTC) and CTL signal are added to video signal is shown in fig. 3.


AU/TC head
R/P ERASE
CTL head
full erase head
Audio 2 track
Audio 1 track
Tape travelling direction
Y track
C track
Head scanning direction
Control track
Time code track

Tape pattern of the Betacam VTR

Fig. 3

In the playback system, playback the tape which is recorded using above mentioned process, and then return to original signal using the reversing process. PVW-2650P is a player, so that it is only provided the following playback system.
At the process of play system, as shown in fig.4, RF signal from Y-R/P head is sent to circuit of TBC after FM demodulated and deemphasized through preamplifier and equalizer. On the other side, chroma signal from C-RP head enter the circuit of TBC after FM demodulated through preamplifier and equalizer. At the circuit of TBC, both of Y and C signal are revised of time axis (revice of jitter element) and drop out (DO process), and at the same time, CTDM chroma signal is expanded in time and returned to B-Y or R-Y signal. Next, the signals are encoded to color-differential, composite or Y/C signal at encoder and output after added burst and sync that are remade at circuit of TBC.

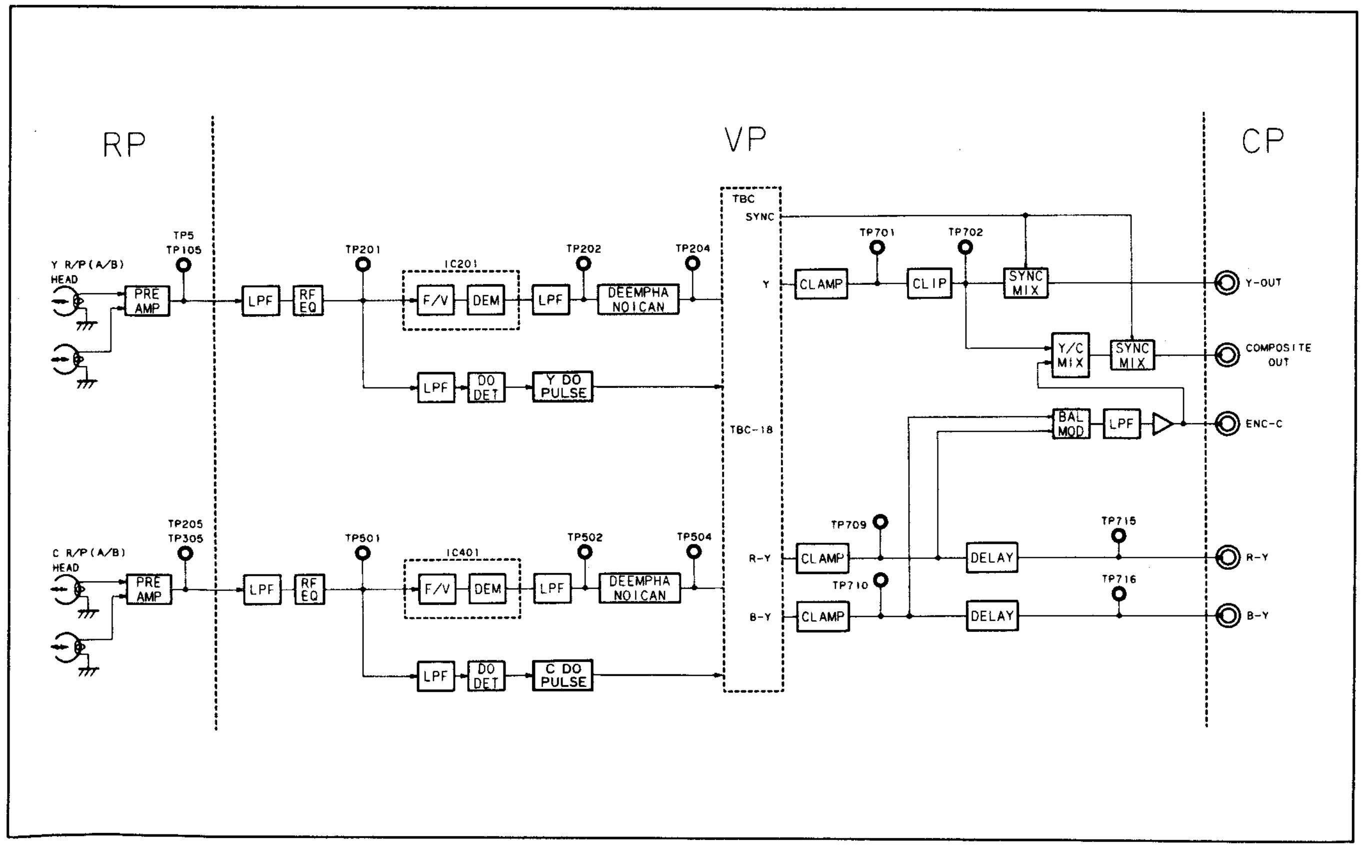

RP
VP
CP
Y R/P (A/B) HEAD
TP5
TP105
PRE AMP
LPF
RF EQ
TP201
IC201
F/V
DEM
LPF
TP202
DEEMPHA NOICAN
TP204
DO DET
Y DO PULSE
TBC
SYNC
Y
TBC-18
R-Y
B-Y
CLAMP
TP701
CLIP
TP702
SYNC MIX
Y-OUT
Y/C MIX
COMPOSITE OUT
BAL MOD
ENC-C
C R/P (A/B) HEAD
TP205
TP305
TP501
IC401
TP502
TP504
C DO PULSE
TP709
TP710
DELAY
TP715
TP716

Fig. 4

SECTION 3
MAINTENANCE MODE

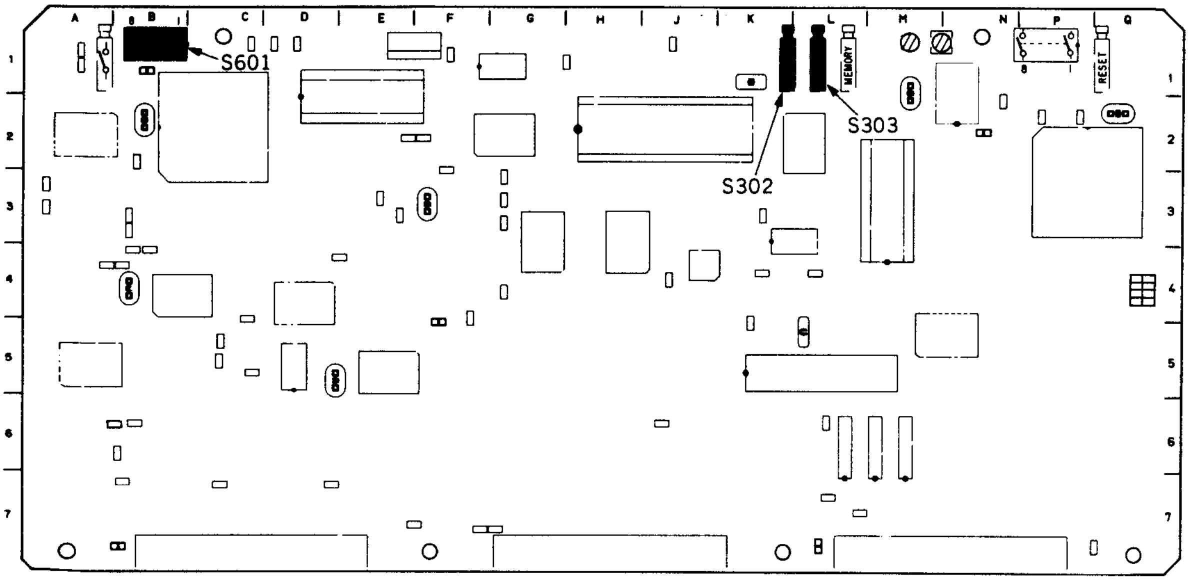
This equipment provides the maintenance mode which is necessary when performing maintenance.
The maintenance mode has following modes of six kinds. Each mode consists of several menus and sub menus.
Contents of the maintenance mode are displayed on the picture monitor which is connected with VIDEO OUTPUT 3 connector or MONITOR connector.

MODE	MENU	SUB MENU
A0 : VIDEO CHECK	A001 : TBC thru pass(Y) A002 : TBC thru pass(C) A003 : TEST SIG. GEN	————
B0 : SERVO CHECK	B01 : INPUT CHECK	B011 : CASSETTE SW B012 : CASSETTE COMP. SW B013 : TOP/END SENSOR B014 : DEW SENSOR
	B02 : MOTOR CHECK	B021 : S REEL B022 : T REEL B023 : THREADING B024 : CASSETTE COMP. B025 : CAPSTAN MOTOR B026 : DRUM MOTOR B027 : REEL POSITION
	B03 : PLUNGER SOL. CHECK	B031 : PINCH ROLLER B032 : S REEL BRAKE B033 : T REEL BRAKE B034 : CLEANING ROLLER
	B04 : REEL/CAPSTAN MOTOR & FG CHECK	————
B1 : SERVO ADJUST	B101 : B102-B108 ADJ. B102 : S REEL FG DUTY B103 : T REEL FG DUTY B104 : CAPSTAN FG DUTY B105 : S REEL OFFSET/FRIC B106 : T REEL OFFSET/FRIC B107 : S REEL TORQUE B108 : T REEL TORQUE B109 : CAPSTAN SPEED B110 : RF SWITCHING POS. B112 : S TENSION SENSOR B113 : T TENSION SENSOR B114 : PICTURE SPLITTING B115 : FWD TENSION B116 : REV TENSION B117 : NV RAM CONTROL	————
C0 : DT CHECK	C01 : Check Interface with DT-29 board C02 : Check strain gauge feed back loop	————

MODE	MENU	SUB MENU
C1 : DT ADJUST	C11 : De-distortion waves C12 : DT Sw. Position C13 : Strain Gauge gains C14 : DT drive amplitudes C15 : Save DT adjust data	————
F : OTHERS	F00 : rom version F01 : front panel check F02 : F03 : F04 : syscon panel check F05 : CF data check F06 : memory check F07 : F08 : TBC initialize	————

Following switches on the SS-48 board or search dial are used so as to execute the maintenance mode.

SS-48 board



S601-1 (B-1) : SERVO ADJUST SW
Set this switch to ON (CLOSE) when executing the "B110: RF SWITCHING POS." in the servo system adjustment mode (B1 : SERVO ADJUST) in the maintenance mode.

S601-4 (B-1) : SERVO ADJUST SW
Set this switch to ON (CLOSE) when executing the servo system adjustment mode (B1 : SERVO ADJUST) in the maintenance mode.

S601-7 (B-1) : SERVO CHECK SW
Set this switch to ON (CLOSE) when executing the servo system check adjustment mode (B0 : SERVO CHECK) in the maintenance mode.

S302 (K-1) : ADJ (+) SW
Press this switch when entering into the maintenance mode. Also press this switch when executing the menu which is selected by search dial.

S303 (L-1) : ADJ (−) SW
Press this switch when returning to the menu picture or mode picture of the maintenance mode. Also press this switch when closing the maintenance mode.

Search Dial : Select a menu or sub menu in the jog mode.

How to enter the maintenance mode

1. When performing the servo system check mode (B0 : SERVO CHECK), turn OFF the POWER, and then set S601-7 switch on the SS-48 board to ON (CLOSE). When performing the servo system adjustment mode (B1 : SERVO ADJUST), turn OFF the POWER, and then set S601-4 switch to ON (CLOSE). When performing the "B110 : RF SWITCHING POS.", besides S601-4, set S601-1 switch to ON (CLOSE).

   NOTE : Omit this step when performing the video system check mode (A0 : VIDEO CHECK) or others check mode (F : OTHERS).
2. Turn ON the POWER, and press S302 switch on the SS-48 board to display modes on the monitor picture.
3. Press the search dial to put the unit into the jog mode, then move the * mark to a desired mode which is displayed on the monitor picture.
4. Press S302 switch on the SS-48 board to select the * marked mode.

How to close the maintenance mode

5. Press S303 switch on the SS-48 board.

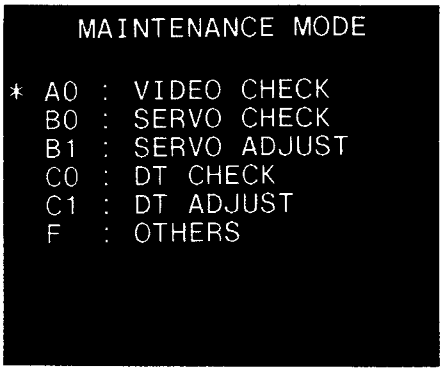
   If S601-7, S601-4 or S601-1 switch on the SS-48 board is set to ON (CLOSE) at step 1, turn OFF the POWER, and reset the switch to OFF (OPEN).

3-1. VIDEO SYSTEM CHECK MODE (A0 : VIDEO CHECK)

Video system is checked automatically or semiautomatically in this mode.

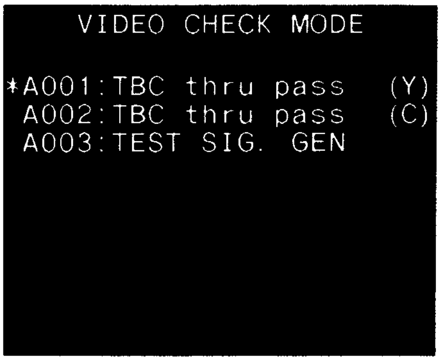
- **Procedure**

1. Press S302 switch on the SS-48 board.
   Then the unit enters into the maintenance mode. Modes of six kinds are displayed on the monitor picture.
2. Press the search dial to put the unit into the jog mode, and move the ∗ mark to "A0 : VIDEO CHECK" mode which is displayed in the monitor picture.



```
   MAINTENANCE MODE

* A0 : VIDEO CHECK
  B0 : SERVO CHECK
  B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

3. Press S302 switch on the SS-48 board.
   Then "A0 : VIDEO CHECK" mode is selected, and menus are displayed on the monitor picture.

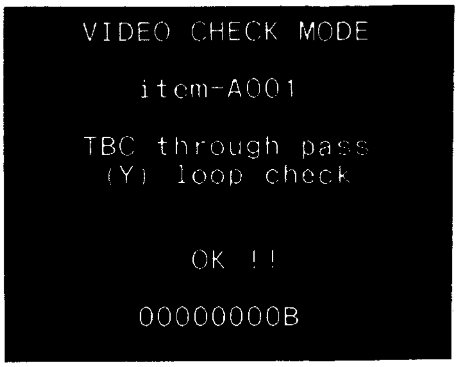


```
   VIDEO CHECK MODE

*A001:TBC thru pass   (Y)
 A002:TBC thru pass   (C)
 A003:TEST SIG. GEN
```

4. Move the ∗ mark to a desired menu by the search dial (jog mode).
5. Press S302 switch on the SS-48 board, and execute the ∗ marked menu.
   Then check is executed automatically.
6. "OK !!" is displayed on the monitor picture when the check finishes.
   If the result of the check is NG, "NG!!" is displayed on the monitor picture.
   In this case, check the related circuit.
7. Press S303 switch on the SS-48 board to return to the menu picture.
8. If there are other menus wishing to be checked, repeat the step 4 to 7.
9. When all the checks are performed, press S303 switch twice to return to the mode picture.
10. When closing the maintenance mode, press S303 switch on the SS-48 board.

A001 : TBC thru pass (Y)

This mode checks whether the digital system (Y) on the TBC-18 board acts normally or not, automatically.



VIDEO CHECK MODE

item-A001

TBC through pass
(Y) loop check

OK !!

00000000B

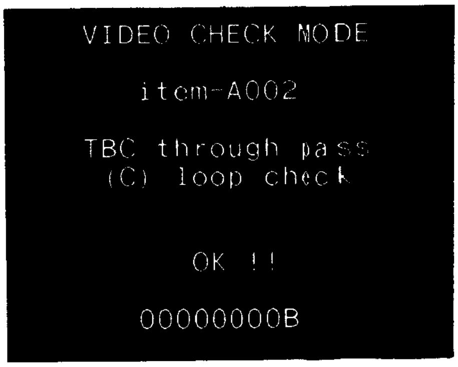
In case of NG

If "NG" is displayed, watch the error indication which is in the lower the monitor picture.
There is unusual on the bit indicated "1". Check the DATA bit indicated "1" of IC501, 503, 504 and 507 on the TBC-18 board.

ex : unusual bit
↓
00100000B
(MSB) (LSB)

A002 : TBC thru pass (C)

This mode checks whether the digital system (C) on the TBC-18 board acts normally or not, automatically.



VIDEO CHECK MODE

item-A002

TBC through pass
(C) loop check

OK !!

00000000B

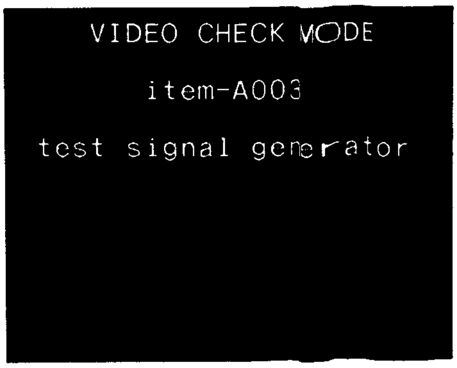
In case of NG

If "NG!!" is displayed, watch the error indication which is in the lower the monitor picture.
There is unusual on the bit indicated "1". Check the DATA bit indicated "1" of IC501, 503, 504 and 507 on the TBC-18 board.

ex : unusual bit
↓
00100000B
(MSB) (LSB)

A003 : TEST SIG. GEN

The built-in test signal generator acts, and the video signal is output from VIDEO OUT 1 / 2 / 3, COMPONENT OUT 1 / 2 and S-VIDEO OUT connectors.
By connecting the signal, the VP-33 board can be checked.



VIDEO CHECK MODE

item-A003

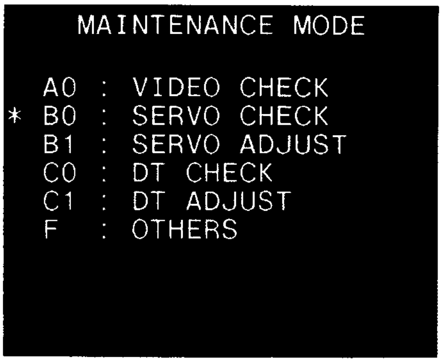
test signal generator

3-2. SERVO SYSTEM CHECK MODE (B0 : SERVO CHECK)

Servo system is checked automatically or semiautomatically in this mode.

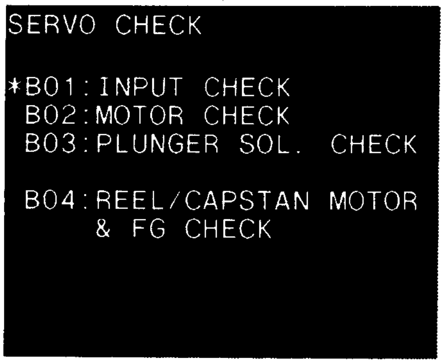
- **Procedure**

1. Turn OFF the POWER, and set S601-7 switch on the SS-48 board to ON (CLOSE).
2. Turn ON the POWER.
3. Press S302 switch on the SS-48 board. Then the unit enters into the maintenance mode. Modes of six kinds are displayed on the monitor picture.
4. Press the search dial to put the unit into the jog mode, then move the ∗ mark to "B0 : SERVO CHECK" which is a mode displayed in the monitor picture.



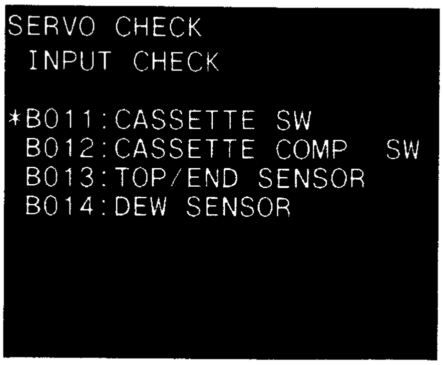
```
       MAINTENANCE MODE

   A0  :  VIDEO CHECK
*  B0  :  SERVO CHECK
   B1  :  SERVO ADJUST
   C0  :  DT CHECK
   C1  :  DT ADJUST
   F   :  OTHERS
```

5. Press S302 switch on the SS-48 board.
   Then "B0: SERVO CHECK" mode is selected, and menus are displayed on the monitor picture.
6. Move the ∗ mark to a desired menu by the search dial (Jog mode).



```
SERVO CHECK

*B01:INPUT CHECK
 B02:MOTOR CHECK
 B03:PLUNGER SOL. CHECK

 B04:REEL/CAPSTAN MOTOR
     & FG CHECK
```

7. Press S302 switch on the SS-48 board.
   Then the sub menus are displayed further.



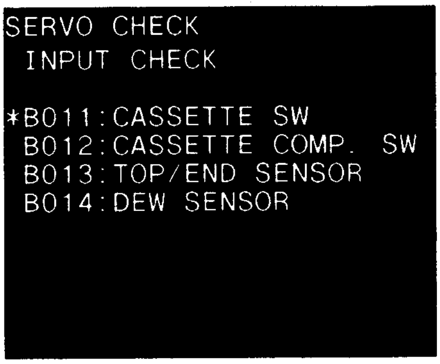
```
SERVO CHECK
 INPUT CHECK

*B011:CASSETTE SW
 B012:CASSETTE COMP SW
 B013:TOP/END SENSOR
 B014:DEW SENSOR
```

8. Move the ∗ mark to a desired sub menu by the search dial (jog mode).

9. Press S302 switch on the SS-48 board, and execute the * marked sub menu.
   (Refer to each page of menu item about a method of check.)
   While the sub menu is being performed, the keyboard operation is possible by pressing S302 on the SS-48 board. (Character displays on the monitor picture continuously.)
   Then, mechanical operation is possible in the maintenance mode.
   In this state, the key board operation is returned to the state of the maintenance mode by pressing S303 on the SS-48 board.
10. When check is finished, press S303 switch on the SS-48 board to return to the submenu picture. Or, press S303 twice to return to the menu picture.
11. If there are other menus or submenus wishing to be checked, repeat the step 4 to 10.
12. When all the checks are performed, press S303 switch on the SS-48 board three times to return to the mode picture.
13. When closing the maintenance mode, press S303 on the SS-48 board. Next, turn OFF the POWER, and reset S601-7 switch on the SS-48 board to OFF (OPEN).

B01 : INPUT CHECK

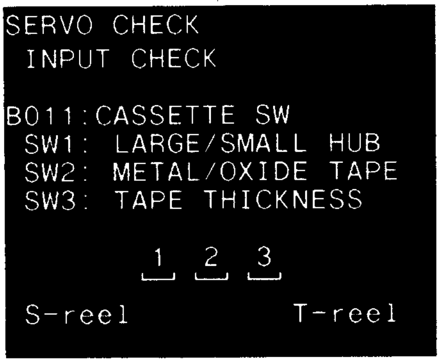
The sub menus of the "B01 : INPUT CHECK" are explained here.



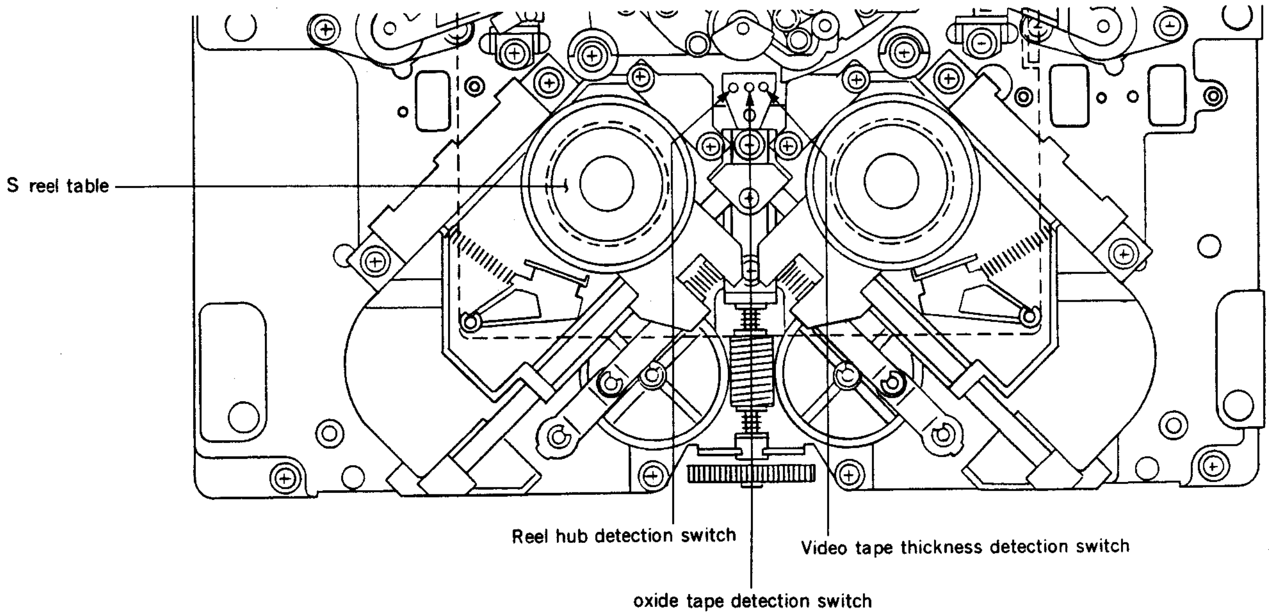
```
SERVO CHECK
 INPUT CHECK

*B011:CASSETTE SW
 B012:CASSETTE COMP. SW
 B013:TOP/END SENSOR
 B014:DEW SENSOR
```

(1) B011: CASSETTE SW

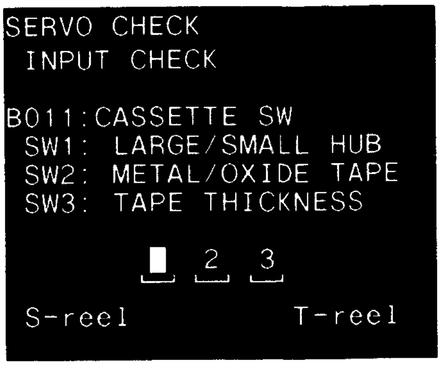
This mode checks the function of the cassette switch (sensor).



```
SERVO CHECK
 INPUT CHECK

B011:CASSETTE SW
 SW1: LARGE/SMALL HUB
 SW2: METAL/OXIDE TAPE
 SW3: TAPE THICKNESS

          1  2  3
         └┘ └┘ └┘
 S-reel           T-reel
```

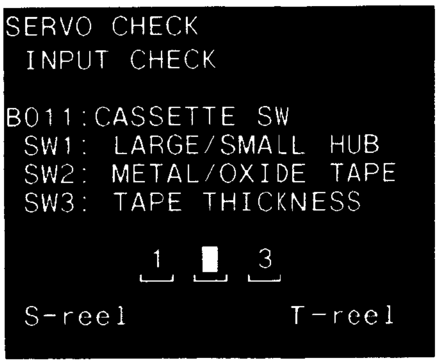

S reel table
Reel hub detection switch
Video tape thickness detection switch
oxide tape detection switch

1. Press the reel hub detection switch (sensor) with finger.
   Confirm that ■ is displayed on the "1" which is in the monitor picture.



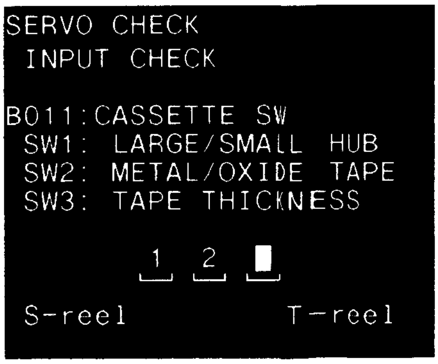
```
SERVO CHECK
 INPUT CHECK

B011:CASSETTE SW
 SW1: LARGE/SMALL HUB
 SW2: METAL/OXIDE TAPE
 SW3: TAPE THICKNESS

         ■  2  3

 S-reel           T-reel
```

2. Press the oxide tape detection switch (sensor) with finger.
   Confirm that ■ is displayed on the "2" which is in the monitor picture.



```
SERVO CHECK
 INPUT CHECK

B011:CASSETTE SW
 SW1: LARGE/SMALL HUB
 SW2: METAL/OXIDE TAPE
 SW3: TAPE THICKNESS

         1  ■  3

 S-reel           T-reel
```

3. Press the video tape thickness detection sensor with finger.
   Confirm that ■ is displayed on the "3" which is in the monitor picture.

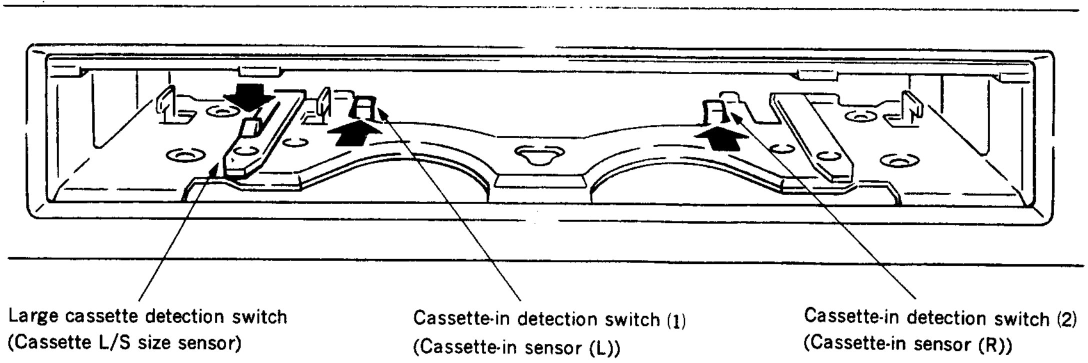


```
SERVO CHECK
 INPUT CHECK

B011:CASSETTE SW
 SW1: LARGE/SMALL HUB
 SW2: METAL/OXIDE TAPE
 SW3: TAPE THICKNESS

         1  2  ■

 S-reel           T-reel
```

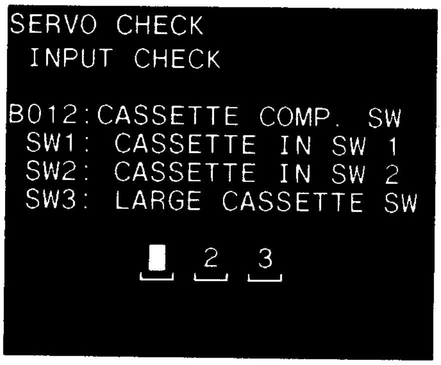
In case of NG
If ■ isn't displayed on the appointed number, check the sensor on the PTC-55 board and the sensor input circuit (DR-118 board).

(2) B012: CASSETTE COMP. SW

This mode checks the function of the Cassette Compartment switch (sensor).

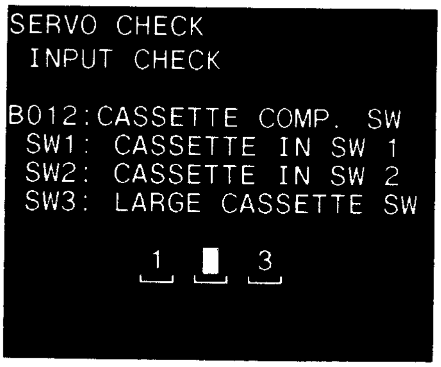

Push up the cassette window with finger
Large cassette detection switch (Cassette L/S size sensor)
Cassette-in detection switch (1) (Cassette-in sensor (L))
Cassette-in detection switch (2) (Cassette-in sensor (R))

1. Press the cassette-in detection switch (1) (cassette-in sensor (L)) with finger.
   Confirm that ■ is displayed on the "1" which is in the monitor picture.



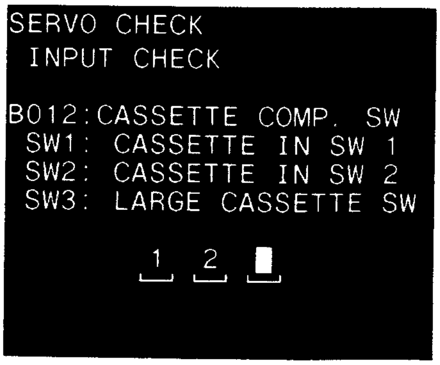
```
SERVO CHECK
 INPUT CHECK

B012:CASSETTE COMP. SW
 SW1: CASSETTE IN SW 1
 SW2: CASSETTE IN SW 2
 SW3: LARGE CASSETTE SW

       ■  2  3
```

2. Press the cassette-in detection switch (2) (cassette-in sensor (R)) with finger.
   Comfirm that ■ is displayed on the "2" which is in the monitor picture.



```
SERVO CHECK
 INPUT CHECK

B012:CASSETTE COMP. SW
 SW1: CASSETTE IN SW 1
 SW2: CASSETTE IN SW 2
 SW3: LARGE CASSETTE SW

       1  ■  3
```

3. Press the large cassette detection switch (cassette L/S size sensor) with finger.
   Comfirm that ■ is displayed on the "3" which is in the monitor picture.

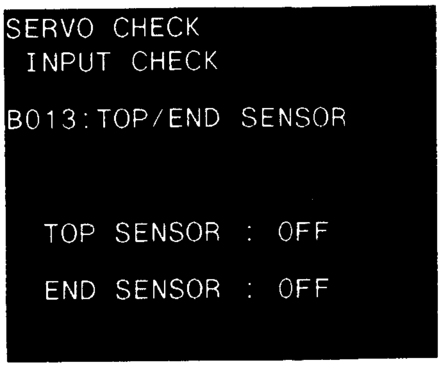


```
SERVO CHECK
 INPUT CHECK

B012:CASSETTE COMP. SW
 SW1: CASSETTE IN SW 1
 SW2: CASSETTE IN SW 2
 SW3: LARGE CASSETTE SW

       1  2  ■
```

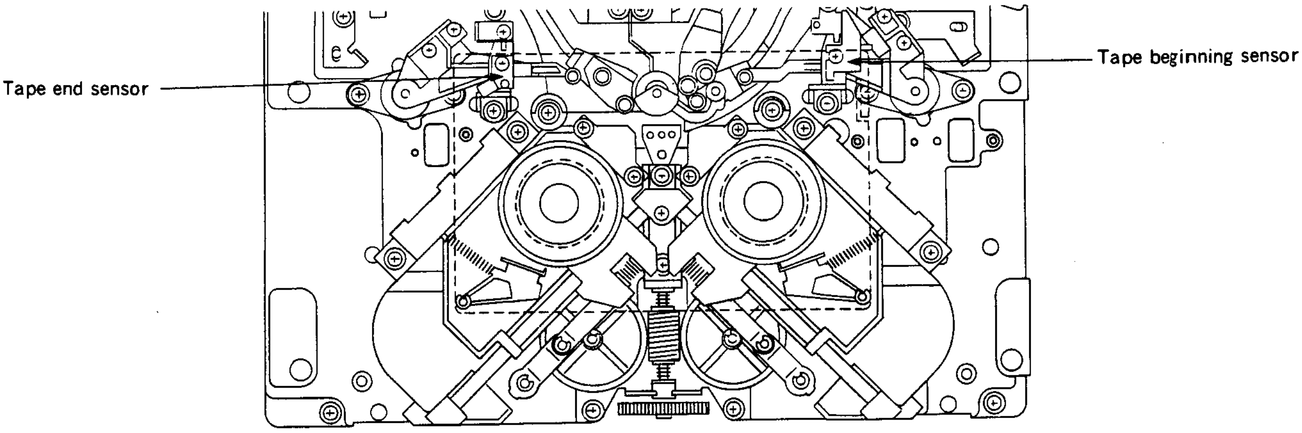
In case of NG
If ■ is not displayed on the appointed number, check the sensor on the PC-62 board and the sensor input circuit (DR-118 board).

(3) B013 : TOP/END SENSOR

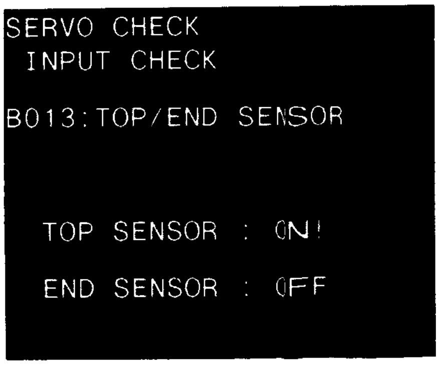
This mode checks the function of the tape beginning/end sensor.



```
SERVO CHECK
 INPUT CHECK

B013:TOP/END SENSOR


  TOP SENSOR  :  OFF

  END SENSOR  :  OFF
```

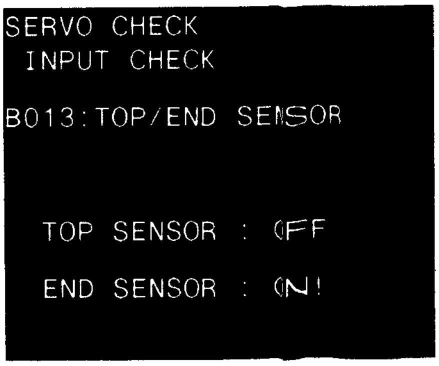


1. Draw a screw driver up to the tape beginning sensor. Confirm that "TOP SENSOR : OFF" which is in the monitor picture changes into "TOP SENSOR : ON!".



```
SERVO CHECK
 INPUT CHECK

B013:TOP/END SENSOR


  TOP SENSOR  :  ON!

  END SENSOR  :  OFF
```

2. Draw a screw driver up to the tape end sensor. Comfirm that "END SENSOR : OFF" which is in the monitor picture changes into "END SENSOR : ON!".

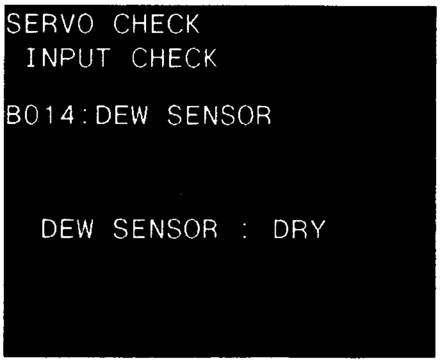


```
SERVO CHECK
 INPUT CHECK

B013:TOP/END SENSOR


  TOP SENSOR  :  OFF

  END SENSOR  :  ON!
```

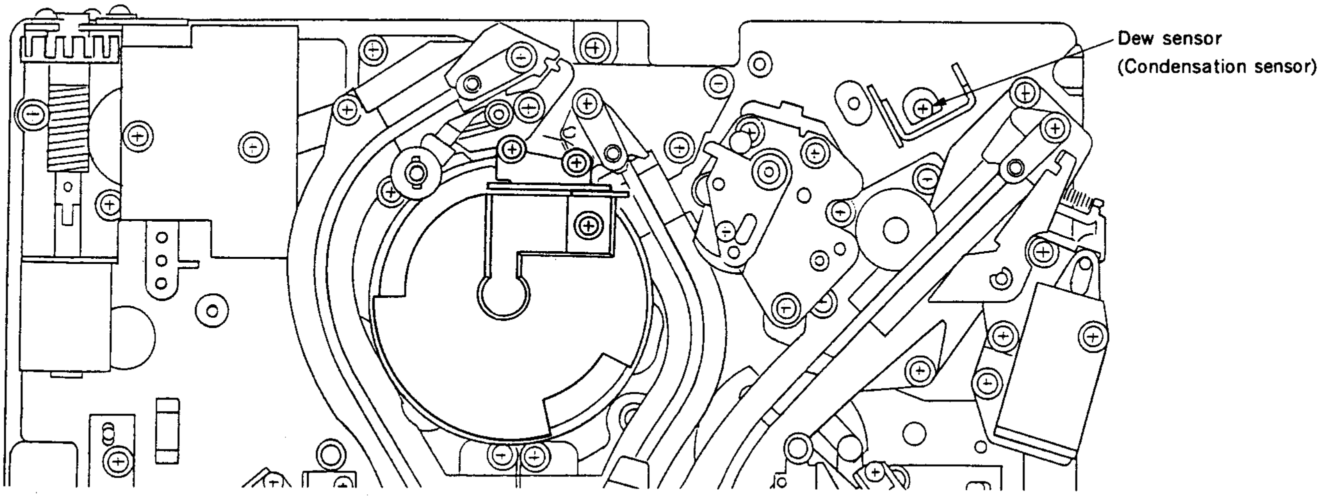
In case of NG
If "OFF" does not change into "ON!", check that the tape beginning/end sensor is normal or not, individually.
And check the tape beginning/end sensor circuit (DR-118 board).

(4) B014: DEW SENSOR

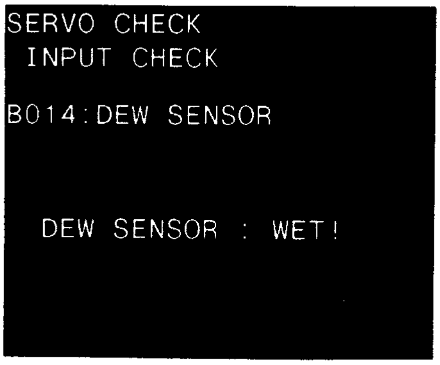
This mode checks the function of the dew (condensation) sensor.



```
SERVO CHECK
 INPUT CHECK

B014:DEW SENSOR


  DEW SENSOR : DRY
```



1. Touch the dew sensor (condensation sensor) softly with a wet applicator.
   Confirm that "DRY" which is in the monitor picture changes into "WET!".



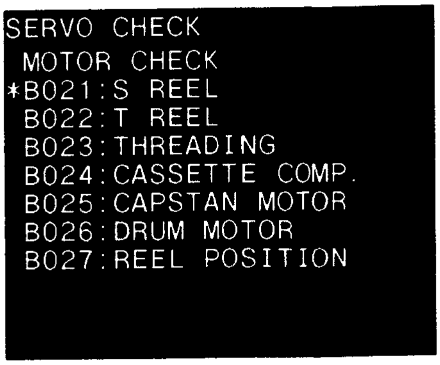
```
SERVO CHECK
 INPUT CHECK

B014:DEW SENSOR


  DEW SENSOR : WET!
```

2. Mop the moisture of the dew sensor (condensation sensor) with a dry applicator, or blow the sensor with a blower to evaporate.
   Confirm that "WET!" which is in the monitor picture changes into "DRY".

In case of NG
If "DRY" does not change to "WET!" when the dew sensor (condensation sensor) is damped, check that condensation sensor is normal or not, individually.
And check the dew sensor amplifier (DS-31 board).

B02 : MOTOR CHECK

The sub menus of the "B02 : Motor Check" are explained here.

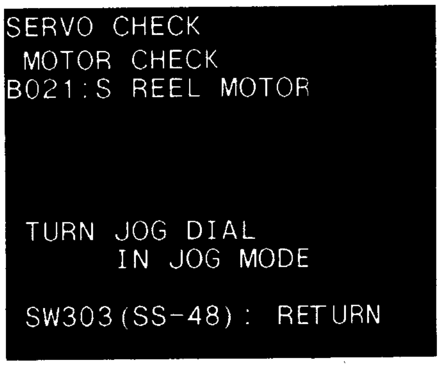


```
SERVO CHECK
 MOTOR CHECK
*B021:S REEL
 B022:T REEL
 B023:THREADING
 B024:CASSETTE COMP.
 B025:CAPSTAN MOTOR
 B026:DRUM MOTOR
 B027:REEL POSITION
```

(1) B021 : S REEL

This mode checks the rotation of the S reel motor.

Set the search dial to the jog mode, and turn it in the direction of forward and reverse. Confirm that the S reel motor rotates in the dial appointed direction, after the brake solenoid engaged to release the reel brake.



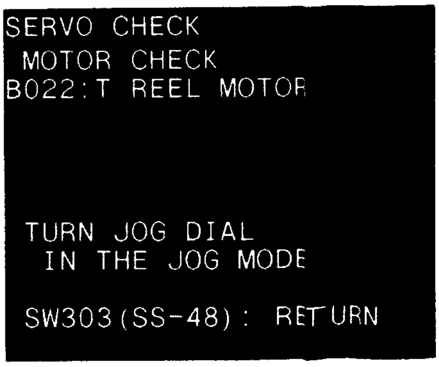
```
SERVO CHECK
 MOTOR CHECK
B021:S REEL MOTOR



 TURN JOG DIAL
      IN JOG MODE

 SW303(SS-48): RETURN
```

In case of NG
If engagement of the brake solenoid is soundless and the S reel motor does not rotate in the dial appointed direction, check the reel motor driver circuit (DR-118 board).

(2) B022 : T REEL

This mode checks the rotation of the T reel motor.

Set the search dial to the jog mode, and turn in the direction of forward and reverse.
Confirm that the T reel motor rotates in the dial appointed direction, after the brake solenoid engaged to release the reel brake.

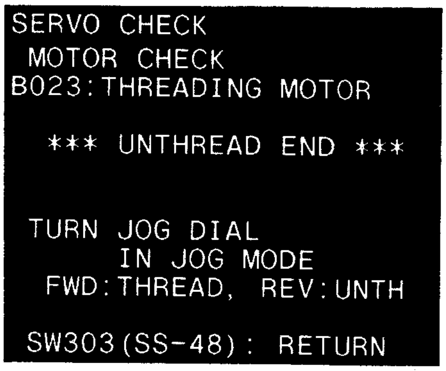


```
SERVO CHECK
 MOTOR CHECK
B022:T REEL MOTOR



 TURN JOG DIAL
  IN THE JOG MODE

 SW303(SS-48): RETURN
```

In case of NG
If engagement of the brake solenoid is soundless, and the T reel motor does not rotate in the dial appointed direction, check the reel motor driver circuit (DR-118 board).

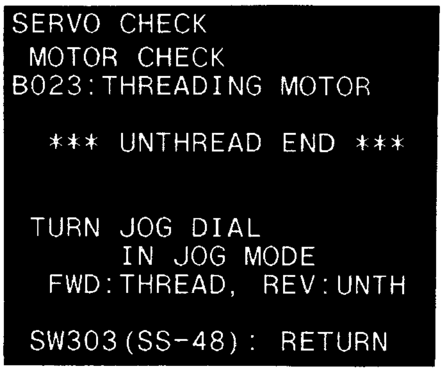
(3) B023: THREADING

This mode checks the rotation of the threading motor and threading-end/unthreading-end sensor.



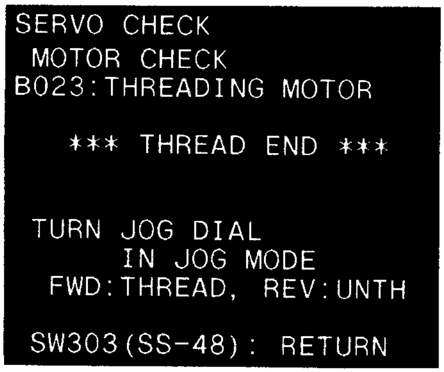
```
SERVO CHECK
 MOTOR CHECK
B023:THREADING MOTOR

   *** UNTHREAD END ***


 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV:UNTH

 SW303(SS-48): RETURN
```

1. Set the search dial to the jog mode, and turn it in the direction of forward.
   Confirm that S slider, T slider and P slider are threaded, and "THREAD END" is displayed on the monitor picture.



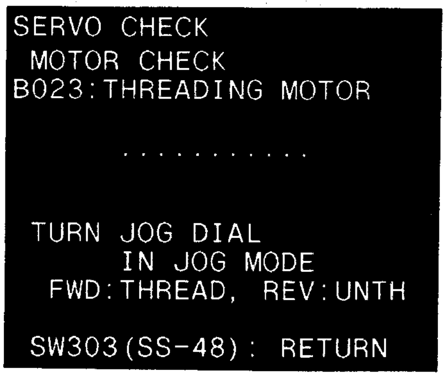
```
SERVO CHECK
 MOTOR CHECK
B023:THREADING MOTOR

   *** UNTHREAD END ***


 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV:UNTH

 SW303(SS-48): RETURN
```

2. Turn the search dial in the direction of reverse.
   Confirm that S slider, T slider and P slider are unthreaded, and "UNTHREAD END" is displayed on the monitor picture.



```
SERVO CHECK
 MOTOR CHECK
B023:THREADING MOTOR

    *** THREAD END ***


 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV:UNTH

 SW303(SS-48): RETURN
```

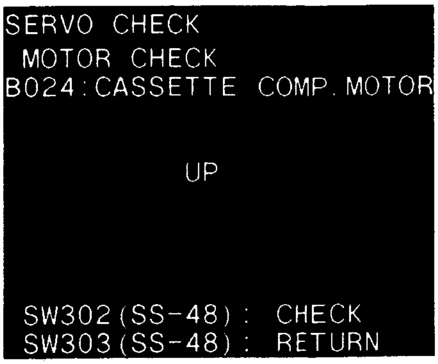
In case of NG
If the threading motor does not rotate, "…………" is displayed on the monitor picture after finishing threading, or "UNTHREAD END" is not displayed on the monitor picture after finishing unthreading, confirm that whether the threading motor and sensor on the PTC-49 board are normal or not. Also, check the loading motor driver circuit, loading FG amplifier circuit (DR-118 board), and loading TOP/END switch.



```
SERVO CHECK
 MOTOR CHECK
B023:THREADING MOTOR

       . . . . . . . . . . .


 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV:UNTH

 SW303(SS-48): RETURN
```

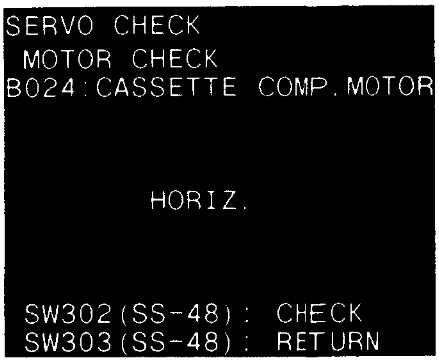
(4) B024 : CASSETTE COMP.

This mode checks the cassette compartment motor.



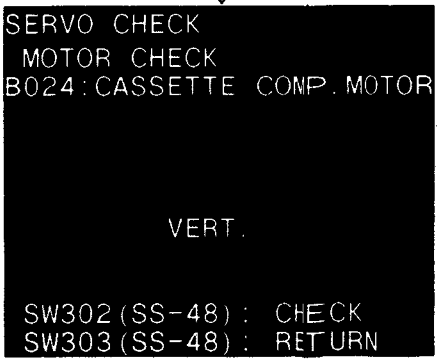
```
SERVO CHECK
 MOTOR CHECK
B024:CASSETTE COMP.MOTOR

           UP

 SW302(SS-48) :  CHECK
 SW303(SS-48) :  RETURN
```

Press S302 switch on the SS-48 board.
Confirm that cassette compartment goes down.
Confirm that cassette compartment goes up when pressing S302 switch again. (Compared with going down case, the display on the monitor picture changes in the reverse order.)



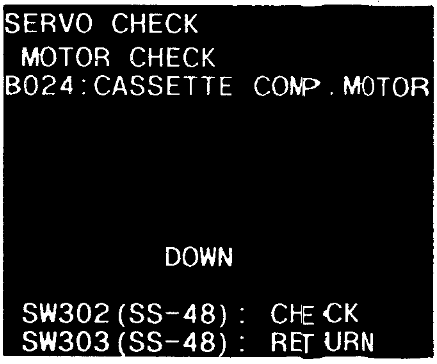
```
SERVO CHECK
 MOTOR CHECK
B024:CASSETTE COMP.MOTOR

         HORIZ.

 SW302(SS-48) :  CHECK
 SW303(SS-48) :  RETURN
```

⇩



```
SERVO CHECK
 MOTOR CHECK
B024:CASSETTE COMP.MOTOR

          VERT.

 SW302(SS-48) :  CHECK
 SW303(SS-48) :  RETURN
```

⇩

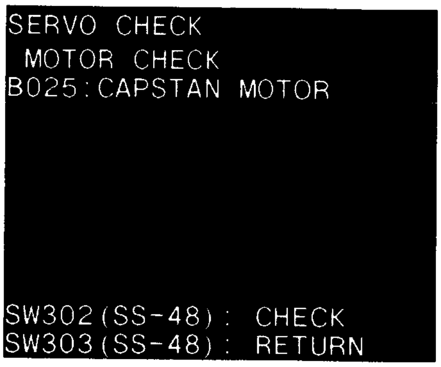


```
SERVO CHECK
 MOTOR CHECK
B024:CASSETTE COMP.MOTOR

          DOWN

 SW302(SS-48) :  CHECK
 SW303(SS-48) :  RETURN
```

In case of NG
If the display on the monitor picture doesn't change, check the cassette compartment motor and the sensor input circuit (DR-118 borad).

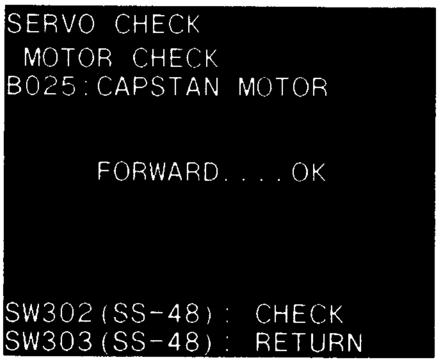
(5) B025: CAPSTAN MOTOR

This mode checks the direction of the rotation of the capstan motor.



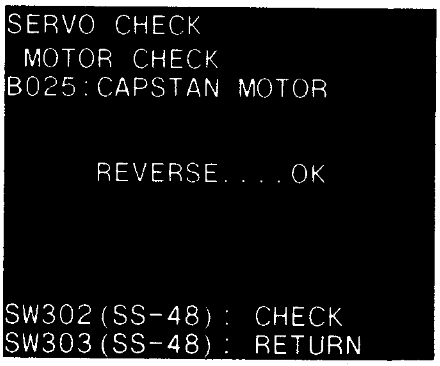
```
SERVO CHECK
 MOTOR CHECK
B025:CAPSTAN MOTOR






SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

1. Press S302 switch on the SS-48 board.
   Confirm that "FORWORD...OK" is displayed on the monitor picture.



```
SERVO CHECK
 MOTOR CHECK
B025:CAPSTAN MOTOR

      FORWARD....OK



SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

2. Press S302 switch on the SS-48 board again.
   Confirm that "REVERSE...OK" is displayed on the monitor picture.

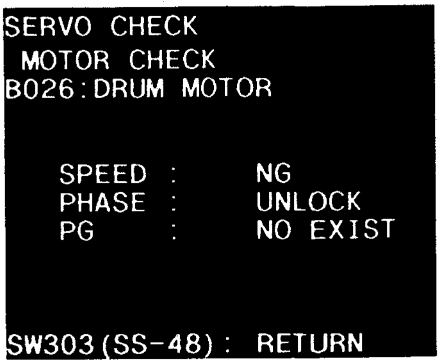


```
SERVO CHECK
 MOTOR CHECK
B025:CAPSTAN MOTOR

      REVERSE....OK



SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

In case of NG
If the display on the monitor picture does not change, check the capstan motor and the capstan motor driver circuit (DR-118 board).

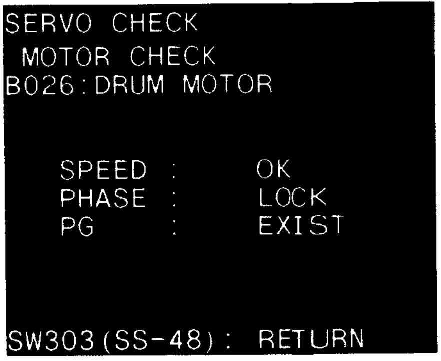
(6) B026 : DRUM MOTOR

This mode checks the rotation of the drum motor.



```
SERVO CHECK
 MOTOR CHECK
B026:DRUM MOTOR


   SPEED  :     NG
   PHASE  :     UNLOCK
   PG     :     NO EXIST


SW303(SS-48) :  RETURN
```

⇩



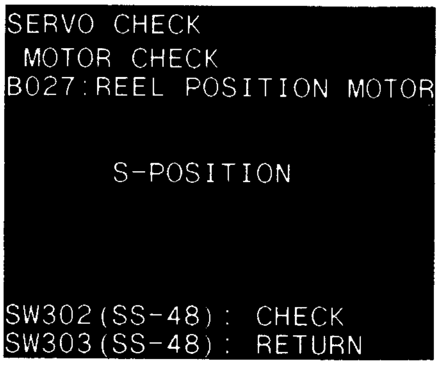
```
SERVO CHECK
 MOTOR CHECK
B026:DRUM MOTOR


   SPEED  :     OK
   PHASE  :     LOCK
   PG     :     EXIST


SW303(SS-48) :  RETURN
```

SPEED	: Confirm that the display in the monitor picture changes into "OK".
PHASE	: Confirm that the display in the monitor picture changes into "LOCK".
PG	: Confirm that the display in the monitor picture changes into "EXIST".

In case of NG
If the display on the monitor picture does not change, check the drum motor, drum motor driver circuit, drum FG amplifier circuit, and drum PG amplifier circuit (DR-118 board).

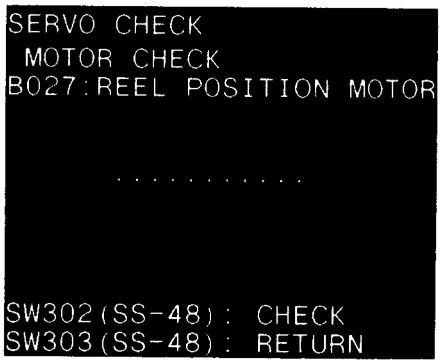
(7) B027: REEL POSITION MOTOR

This mode checks the action of the reel position motor and the function of the reel L/S position sensor.



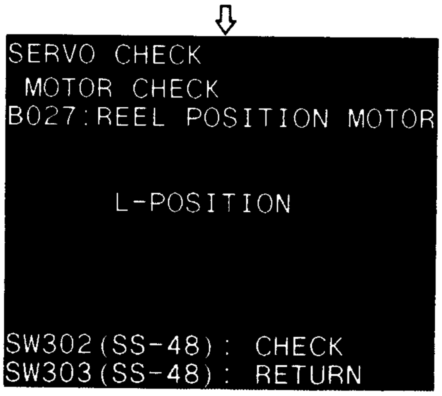
```
SERVO CHECK
 MOTOR CHECK
B027:REEL POSITION MOTOR

       S-POSITION



SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

Press S302 switch on the SS-48 board.
Confirm that the reel table moves S-POSITION to L-POSITION, and the display changes.



```
SERVO CHECK
 MOTOR CHECK
B027:REEL POSITION MOTOR

       . . . . . . . . . . .



SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

⇩

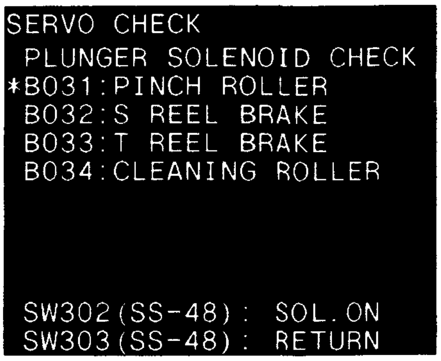


```
SERVO CHECK
 MOTOR CHECK
B027:REEL POSITION MOTOR

       L-POSITION



SW302(SS-48): CHECK
SW303(SS-48): RETURN
```

In case of NG
If the reel table does not move and the display on the monitor picture does not change, check the reel shift motor, reel L/S position sensor (PTC-42 board) and reel position motor driver circuit (DR-118 board).

B03 : PLUNGER SOL. CHECK

The submenus of the "B03 : PLUNGER SOL. CHECK" are explained here.



```
SERVO CHECK
 PLUNGER SOLENOID CHECK
*B031:PINCH ROLLER
 B032:S REEL BRAKE
 B033:T REEL BRAKE
 B034:CLEANING ROLLER



 SW302(SS-48) :  SOL.ON
 SW303(SS-48) :  RETURN
```

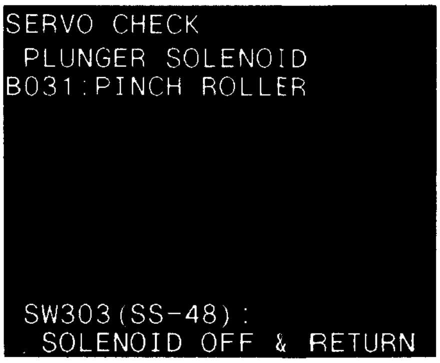
(1) B031 : PINCH ROLLER

This mode checks the action of the pinch roller solenoid.

1. Press S302 switch on the SS-48 board.
   Confirm with a sound that the pinch solenoid is set to ON.
2. Press S303 switch on the SS-48 board.
   Then the voltage which is supplied to pinch solenoid is set to OFF. And the monitor picture returns to the sub menu picture.
3. Push the pinch lever in the direction of the pinch solenoid lightly.
   Then iron core of the pinch solenoid is back to the original position.

In case of NG

If there is no sound that the pinch solenoid is set to ON, and the monitor picture does not change, check the pinch solenoid and circuit.

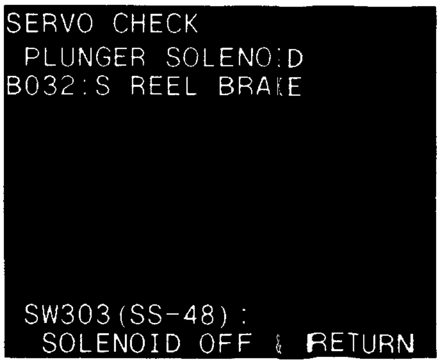


```
SERVO CHECK
 PLUNGER SOLENOID
B031:PINCH ROLLER



 SW303(SS-48) :
  SOLENOID OFF & RETURN
```

(2) B032 : S REEL BRAKE

This mode checks the action of the S reel brake solenoid.

1. Press S302 switch on the SS-48 board.
   Confirm with a sound that the S reel brake solenoid is set to ON.
2. Press S303 switch on the SS-48 board.
   Then iron core of the S reel brake solenoid is back to the original position. And the monitor picture returns to the sub menu picture.



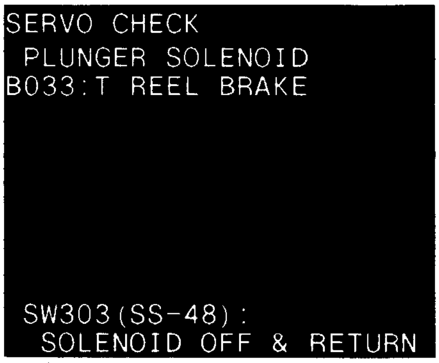
```
SERVO CHECK
 PLUNGER SOLENOID
B032:S REEL BRAKE



 SW303(SS-48) :
  SOLENOID OFF & RETURN
```

In case of NG

If there is no sound that S reel brake solenoid is set to ON, and the monitor picture does not change, check the S reel brake solenoid, reel brake plunger and driver circuit (DR-118 board).

(3) B033 : T REEL BRAKE

This mode checks the action of the T reel brake solenoid.



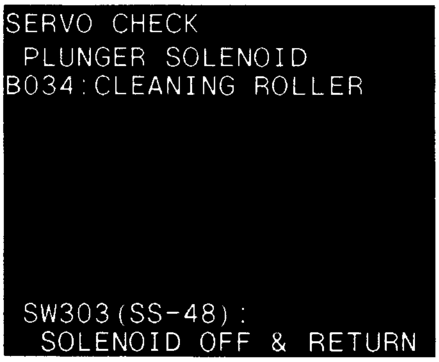
```
SERVO CHECK
 PLUNGER SOLENOID
B033:T REEL BRAKE




 SW303(SS-48):
  SOLENOID OFF & RETURN
```

1. Press S302 switch on the SS-48 board.
   Confirm with a sound that the T reel brake solenoid is set to ON.
2. Press S303 switch on the SS-48 board.
   Then iron core of the T reel brake solenoid is back to the original position. And the monitor picture returns to the sub menu picture.

In case of NG
If there is no sound that the T reel brake solenoid is set to ON, and the monitor picture does not change, check the T reel brake solenoid, reel brake plunger and driver circuit (DR-118 board).

(4) B034 : CLEANING ROLLER

This mode checks the action of the cleaning roller solenoid.



```
SERVO CHECK
 PLUNGER SOLENOID
B034:CLEANING ROLLER




 SW303(SS-48):
  SOLENOID OFF & RETURN
```

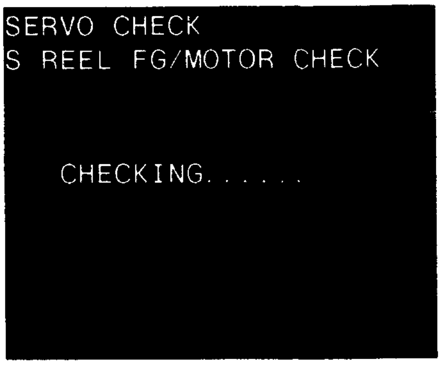
1. Press S302 switch on the SS-48 board.
   Confirm that the cleaning roller solenoid is set to ON, and the cleaning roller is pressed to drum.
2. Press S302 switch on the SS-48 board.
   Then the cleaning roller solenoid is set to OFF, and the cleaning roller is separated from the drum. And the monitor picture returns to the sub menu picture.

In case of NG
If the cleaning roller is not pressed to the drum, check the cleaning roller solenoid and solenoid drive circuit (DR-118 board).

B04 : REEL/CAPSTAN MOTOR & FG CHECK

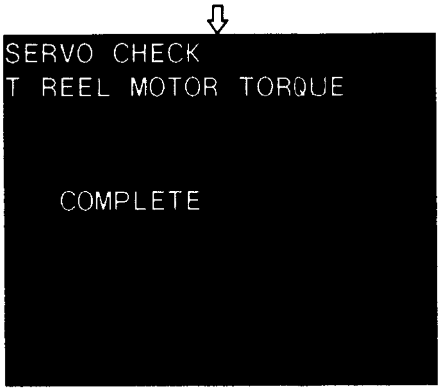
When pressig S302 on the SS-48 board, the following check is performed automatically.

S REEL FG/MOTOR CHECK
T REEL FG/MOTOR CHECK
CAPSTAN FG/MOTOR CHECK
S REEL FRICTION/OFFSET
T REEL FRICTION/OFFSET
S REEL MOTOR TORQUE
T REEL MOTOR TORQUE



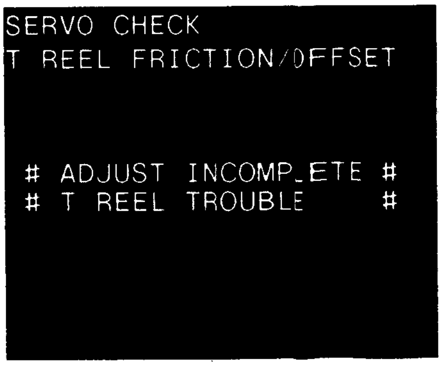
```
SERVO CHECK
S REEL FG/MOTOR CHECK


   CHECKING......
```

When all the check are performed, and all are normal, "COMPLETE" is displayed on the monitor picture.



```
SERVO CHECK
T REEL MOTOR TORQUE


   COMPLETE
```

In case of NG
If the contents of the trouble are displayed on the monitor picture, check the relative circuit of the trouble.



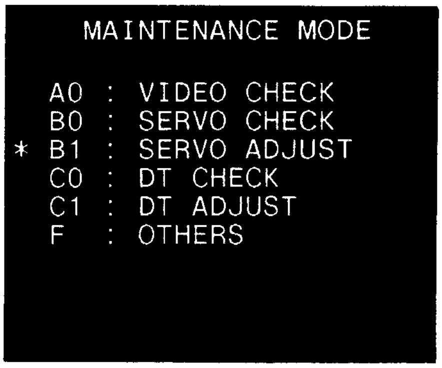
```
SERVO CHECK
T REEL FRICTION/OFFSET


 # ADJUST INCOMPLETE #
 # T REEL TROUBLE     #
```

3-3. SERVO SYSTEM ADJUSTMENT MODE (B1 : SERVO ADJUST)

Servo system is adjusted automatically or semiautomatically in this mode.

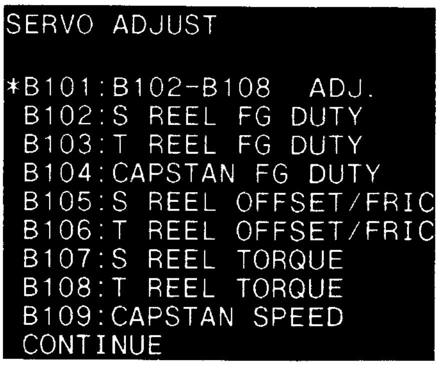
- **Procedure**

1. Turn OFF the POWER, and set S601-4 switch on the SS-48 board to ON (CLOSE). When performing the "B110 : RF SWITCHING POS.", besides S601-4, set S601-1 switch to ON (CLOSE).
2. Turn ON the POWER.
3. Press the EJECT button to put the unit into the EJECT mode.
   NOTE : If the unit is not set to the EJECT mode, the servo system adjustment mode does not run.
4. Press S302 switch on the SS-48 board.
   Then the unit enters into the maintenance mode. Modes of six kinds are displayed on the monitor picture.
5. Press the search dial to put the unit into the jog mode, and move the * mark to "B1 : SERVO ADJUST" which is a mode displayed in the monitor picture.

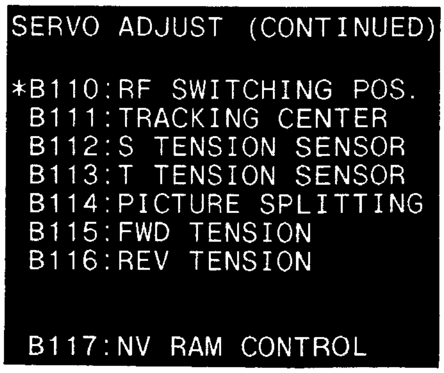


```
   MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

6. Press S302 switch on the SS-48 board.
   Then "B1 : SERVO ADJUST" mode is selected, and menus are displayed on the monitor picture.



```
SERVO ADJUST

*B101:B102-B108  ADJ.
 B102:S REEL FG DUTY
 B103:T REEL FG DUTY
 B104:CAPSTAN FG DUTY
 B105:S REEL OFFSET/FRIC
 B106:T REEL OFFSET/FRIC
 B107:S REEL TORQUE
 B108:T REEL TORQUE
 B109:CAPSTAN SPEED
 CONTINUE
```

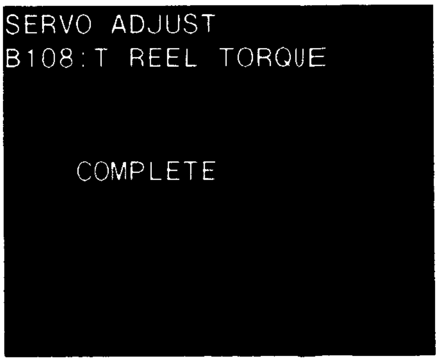


```
SERVO ADJUST (CONTINUED)

*B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


 B117:NV RAM CONTROL
```

7. Move the * mark to a desired menu by the search dial (jog mode).
8. Press S302 switch on the SS-48 board, and execute the * marked menu.
   (Refer to each page of menu about a method of adjustment.)
9. When all the adjustments are performed, press S303 switch on the SS-48 board to return to the menu picture.
   NOTE: To have the NV RAM memorize the adjustment data after an adjustment is performed, execute the "B117: NV RAM control".
   Also it is possible to have the NV RAM memorize all the adjustment data after multi adjustments are performed. At that time, execute the "B117: NV RAM CONTROL" after all adjustments are performed.
10. If there are other menus wishing to be adjusted, repeat the step 7 to 9.
11. When all the adjustments are performed, press S303 switch on the SS-48 board to return to the mode picture.
    NOTE: Have NV RAM memorize the adjustment data.
12. Turn OFF the POWER, and reset S601-4 and S601-1 on the SS-48 board to OFF (OPEN).

B101: B102-B108 ADJ

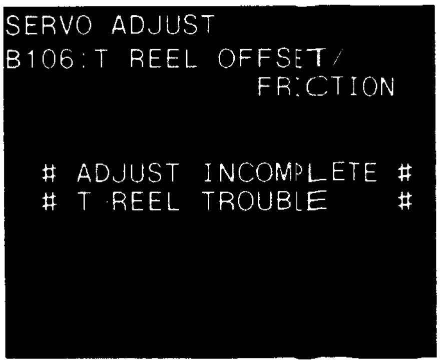
Adjustments of B102 to B108 menus are performed automatically.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



SERVO ADJUST
B108:T REEL TORQUE

COMPLETE

In case of NG
"ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture.
In this case, check the relative circuit of the trouble.

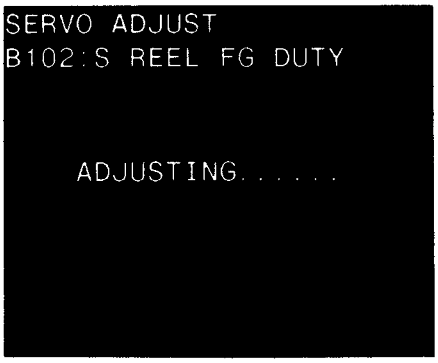


SERVO ADJUST
B106:T REEL OFFSET/
FRICTION

ADJUST INCOMPLETE
T REEL TROUBLE

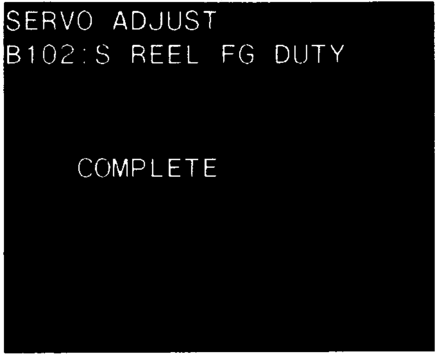
B102 : S REEL FG DUTY

This mode adjusts the S reel FG duty.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST
B102:S REEL FG DUTY


    ADJUSTING......
```

⇩

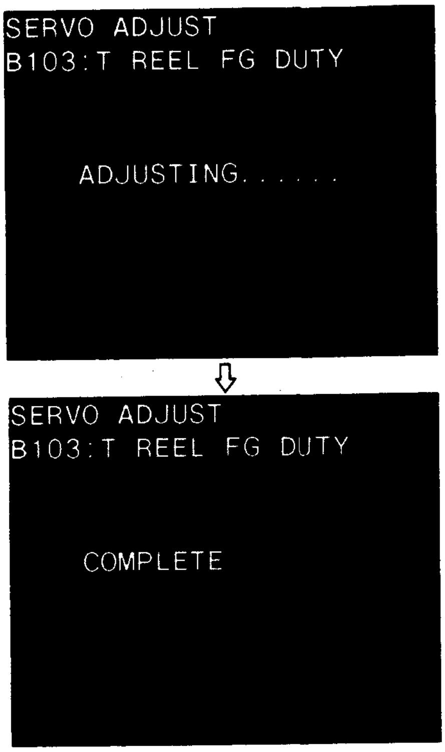


```
SERVO ADJUST
B102:S REEL FG DUTY


    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, check the reel FG amplifier circuit and the reel motor driver circuit (DR-118 board, SS-48 board).

B103 : T REEL FG DUTY

This mode adjusts the T reel FG duty.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



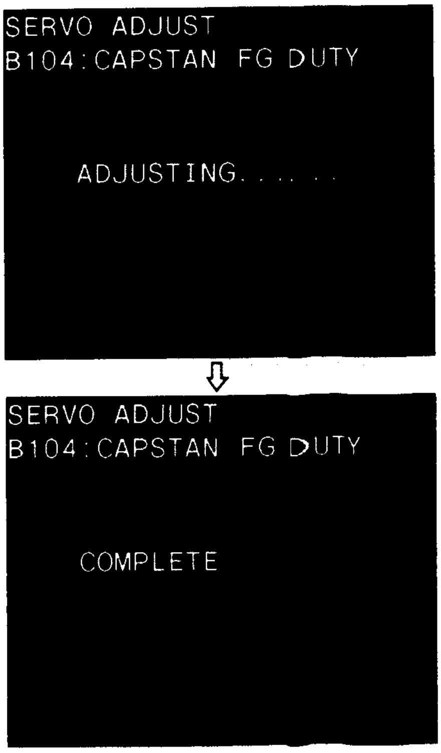
```
SERVO ADJUST
B103:T REEL FG DUTY

      ADJUSTING......
```

```
SERVO ADJUST
B103:T REEL FG DUTY

      COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, check the reel FG amplifier circuit and the reel motor driver circuit (DR-118 board, SS-48 board).

B104 : CAPSTAN FG DUTY

This mode adjusts the capstan FG duty.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



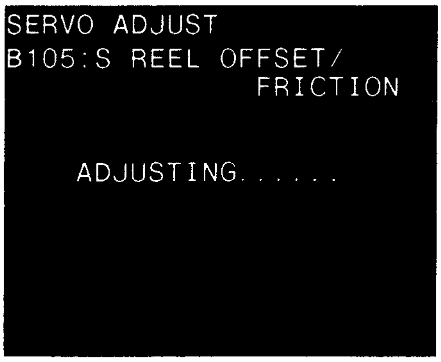
```
SERVO ADJUST
B104:CAPSTAN FG DUTY

      ADJUSTING......
```

```
SERVO ADJUST
B104:CAPSTAN FG DUTY

      COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, check the capstan motor driver circuit (DR-118 board) and the capstan FG amplifier circuit (SS-48 board).

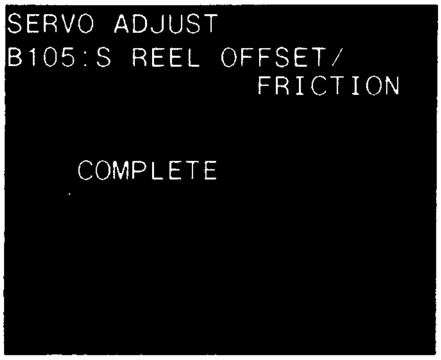
B105 : S REEL OFFSET/FRIC

This mode adjusts the S reel offset/friction.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST
B105:S REEL OFFSET/
               FRICTION

    ADJUSTING......
```

⇩

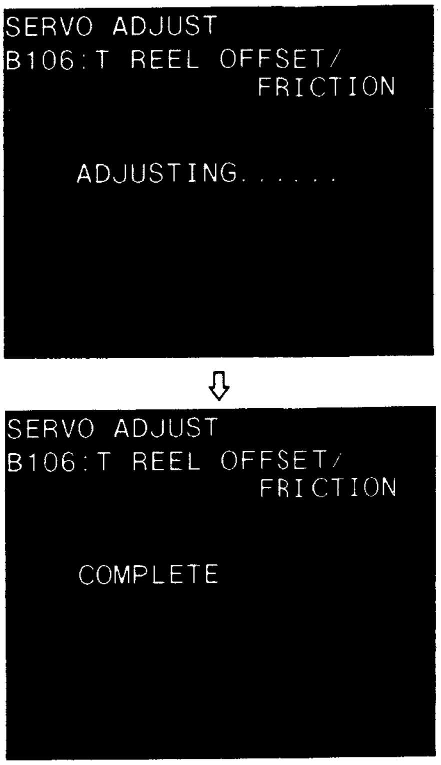


```
SERVO ADJUST
B105:S REEL OFFSET/
               FRICTION

    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, adjust the S reel FG duty again (B102 : S REEL FG DUTY). And check the reel motor driver circuit (DR-118 board).

B106 : T REEL OFFSET/FRIC

This mode adjusts the T reel offset/friction. Confirm that adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST
B106:T REEL OFFSET/
              FRICTION

    ADJUSTING......
```

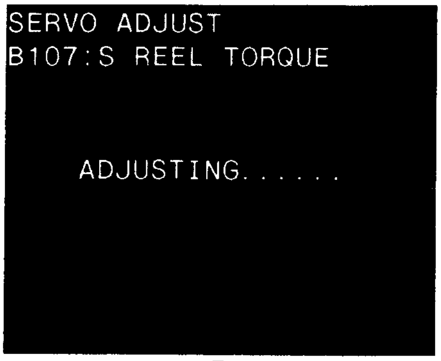
⇩

```
SERVO ADJUST
B106:T REEL OFFSET/
              FRICTION

    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, adjust the T reel FG duty again (B103 : T REEL FG DUTY). And check the reel motor driver circuit (DR-118 board).

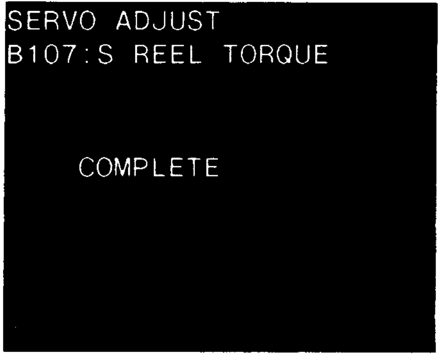
B107 : S REEL TORQUE

This mode adjusts the S reel torque.
Confirm that adjustment is performed and "COMPLETE" is displayed.



```
SERVO ADJUST
B107:S REEL TORQUE

    ADJUSTING......
```

⇩

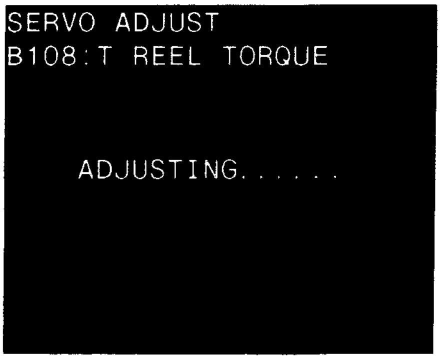


```
SERVO ADJUST
B107:S REEL TORQUE

    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, adjust the S reel FG duty again (B102 : S REEL FG DUTY). And check the reel motor driver circuit (DR-118 board).

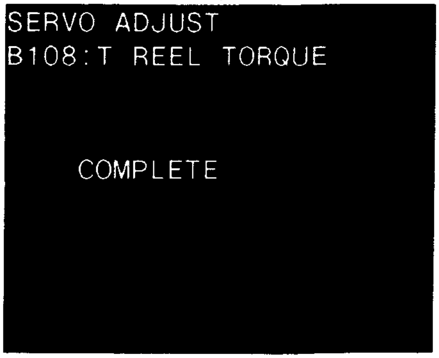
B108 : T REEL TORQUE

This mode adjusts the T reel torque.
Confirm that adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST
B108:T REEL TORQUE

    ADJUSTING......
```

⇩

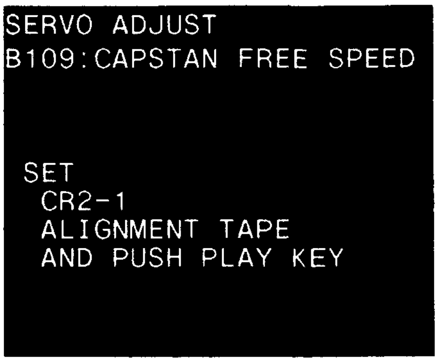


```
SERVO ADJUST
B108:T REEL TORQUE

    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, adjust the T reel FG duty again (B103 : T REEL FG DUTY). And check the reel motor driver circuit (DR-118 board).

B109 : CAPSTAN SPEED

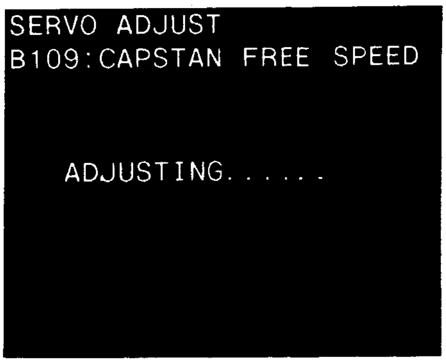
This mode adjusts the capstan free speed.



```
SERVO ADJUST
B109:CAPSTAN FREE SPEED


 SET
  CR2-1
  ALIGNMENT TAPE
  AND PUSH PLAY KEY
```

Insert the alignment tape CR2-1B PS, and press the PLAY button.

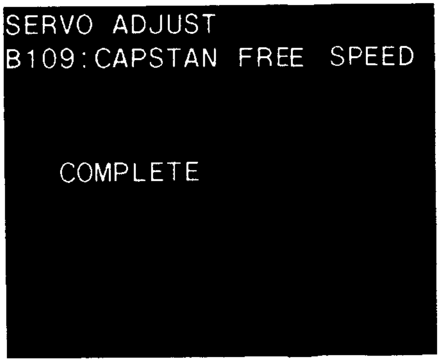
NOTE : Be sure to use the alignment tape CR2-1B PS.
It may display "COMPLETE" even after the adjustment which is played back by other alignment tape. But when not using the alignment tape which is regulated tape speed strictly, it is impossible to get correct adjustment data.



```
SERVO ADJUST
B109:CAPSTAN FREE SPEED


    ADJUSTING......
```

⇩

Confirm that adjustment is performed, and "COMPLETE" is displayed.
The cassette tape is ejected automatically.



```
SERVO ADJUST
B109:CAPSTAN FREE SPEED


    COMPLETE
```

In case of NG
If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, check the capstan FG amplifier, capstan motor drive and CTL amplifier circuit (DR-118 borad).

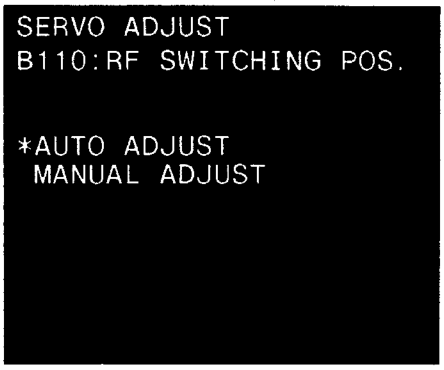
B110 : RF SWITCHING POS.

This mode adjusts the RF switching position.

When performing this mode, besides S601-4, set S601-1 switch on the SS-48 board to ON (CLOSE).

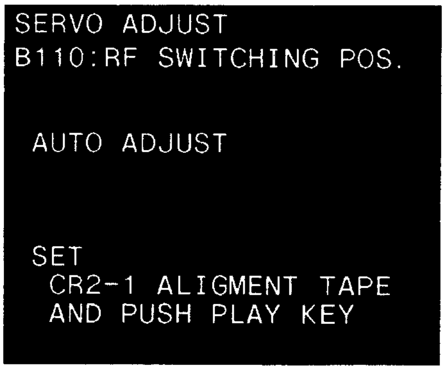
<When AUTO is selected>

1. Move the * mark to "AUTO ADJUST" with the search dial, and press S302 on the SS-48 board.



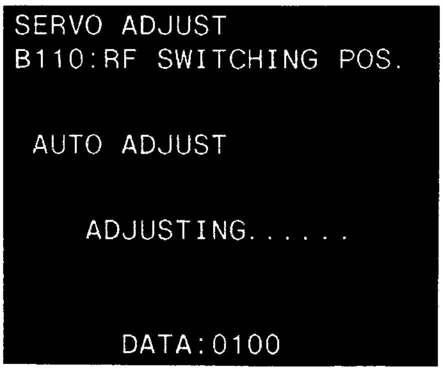
```
SERVO ADJUST
B110:RF SWITCHING POS.

*AUTO ADJUST
 MANUAL ADJUST
```

2. Insert the alignment tape CR2-1B PS, and press the PLAY button.



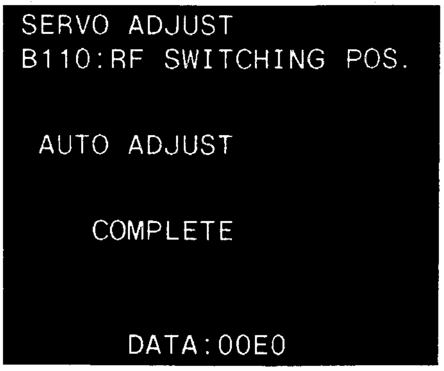
```
SERVO ADJUST
B110:RF SWITCHING POS.

 AUTO ADJUST


 SET
  CR2-1 ALIGMENT TAPE
  AND PUSH PLAY KEY
```

3. The adjustment is performed automatically, and DATA in the monitor picture changes one after another.



```
SERVO ADJUST
B110:RF SWITCHING POS.

 AUTO ADJUST

    ADJUSTING......


       DATA:0100
```

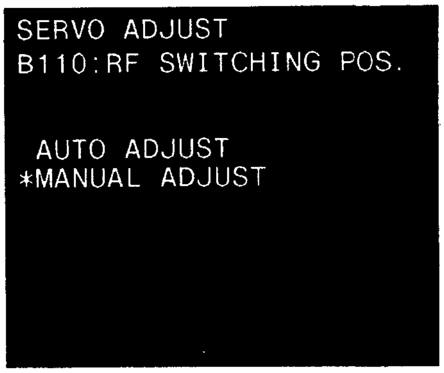
4. Confirm that adjustment is performed, and "COMPLETE" is displayed.



```
SERVO ADJUST
B110:RF SWITCHING POS.

 AUTO ADJUST

    COMPLETE


       DATA:00E0
```

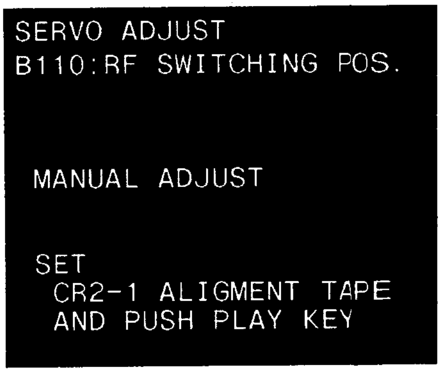
<When MANUAL is selected>

1. Move the * mark to "MANUAL ADJUST" with the search dial, and press S302 on the SS-48 board.



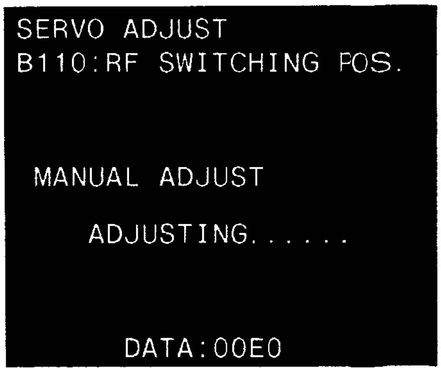
```
SERVO ADJUST
B110:RF SWITCHING POS.

 AUTO ADJUST
*MANUAL ADJUST
```

2. Insert the alignment tape CR2-1B PS, and press the PLAY button.



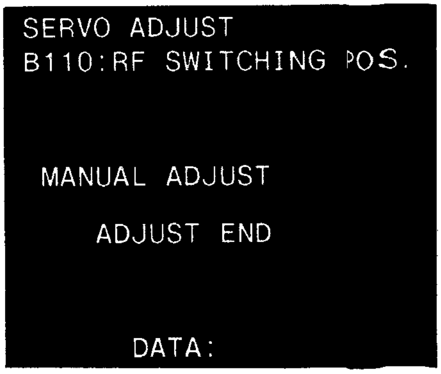
```
SERVO ADJUST
B110:RF SWITCHING POS.


 MANUAL ADJUST


 SET
  CR2-1 ALIGMENT TAPE
  AND PUSH PLAY KEY
```

3. Perform the adjustment with the search dial by RF waveform of the oscilloscope. At that time, switching position is moved, and DATA in the monitor picture changes.



```
SERVO ADJUST
B110:RF SWITCHING POS.


 MANUAL ADJUST

    ADJUSTING......


       DATA:00E0
```

4. When the specification is met, press S302 on the SS-48 board.

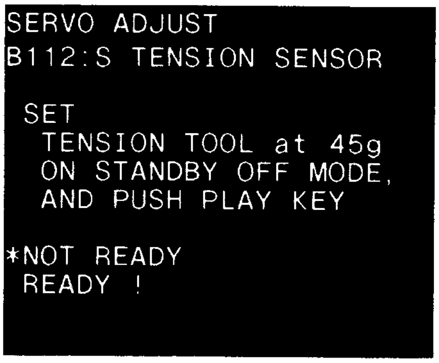


```
SERVO ADJUST
B110:RF SWITCHING POS.


 MANUAL ADJUST

    ADJUST END


       DATA:
```

When performing "MANUAL ADJUST", refer to "NOTE" in section 9-2-2. Y DT switching position adjustment.

B112 : S TENSION SENSOR

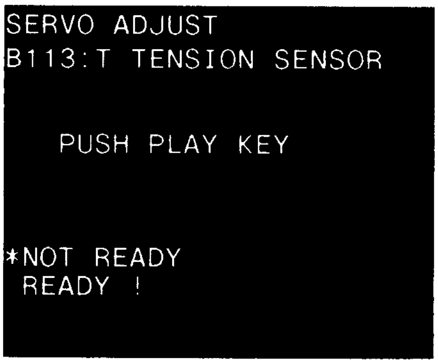
This mode adjusts the sensor of the S tension regulator.
Use fixtures in this adjustment.
Refer to section 5-19-2 about a method of adjustment.



```
SERVO ADJUST
B112:S TENSION SENSOR

 SET
  TENSION TOOL at 45g
  ON STANDBY OFF MODE,
  AND PUSH PLAY KEY

*NOT READY
 READY !
```

B113 : T TENSION SENSOR

This mode adjusts the sensor of the T tension regulator.
Use fixtures in this adjustment.
Refer to section 5-20-2 about a method of adjustment.

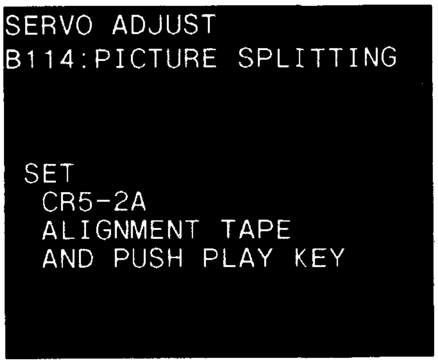


```
SERVO ADJUST
B113:T TENSION SENSOR


    PUSH PLAY KEY



*NOT READY
 READY !
```

B114 : PICTURE SPLITTING

This mode adjusts the picture splitting.

NOTE : This mode is performed only when the picture splitting is serious.

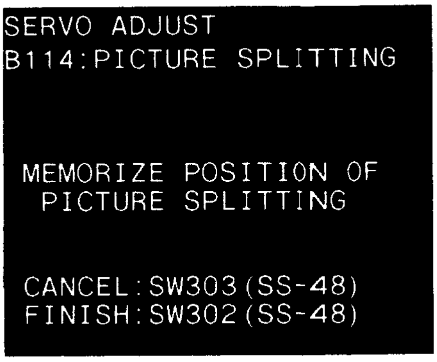


```
SERVO ADJUST
B114:PICTURE SPLITTING


 SET
  CR5-2A
  ALIGNMENT TAPE
  AND PUSH PLAY KEY
```

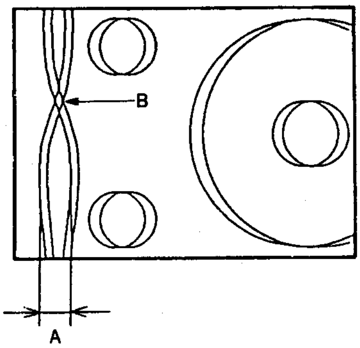
1. Connect the picture monitor to TP202 (D-2) on the VP-33 board using the BNC clip cable.
2. Set the picture monitor as following.
   - H DELAY
   - AFC FAST
   - INT SYNC

   Note : It is impossible to observe with the picture monitor which captured the H sync strongly by the AFC circuit in the picture monitor.
3. Insert the alignment tape CR5-2A PS, and play back the monoscope signal portion. (13:00-15:00).
4. Press S302 on the SS-48 board and measure the picture splitting portion (A portion of the figure) in the picture monitor.

   If the A is 1.5 μs or more (2.4 scales in H direction on the monoscope), the following steps should be performed.

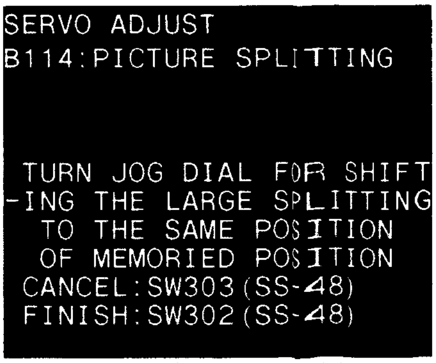


```
SERVO ADJUST
B114:PICTURE SPLITTING


 MEMORIZE POSITION OF
  PICTURE SPLITTING


 CANCEL:SW303(SS-48)
 FINISH:SW302(SS-48)
```



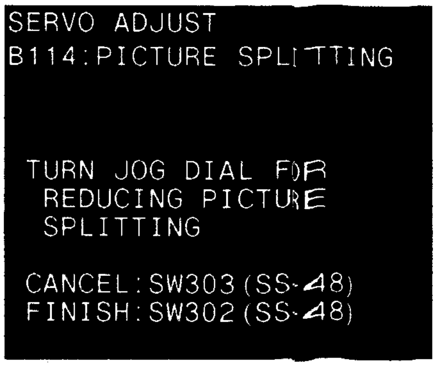
5. Memorize the closs point of the picture splitting portion (B portion of the above figure) in the picture monitor, and press S302 on the SS-48 board.

   NOTE : It is easy to memorize by putting a adhesive tape on the picture monitor.



```
SERVO ADJUST
B114:PICTURE SPLITTING


 TURN JOG DIAL FOR SHIFT
-ING THE LARGE SPLITTING
  TO THE SAME POSITION
  OF MEMORIED POSITION
 CANCEL:SW303(SS-48)
 FINISH:SW302(SS-48)
```

6. Turn the search dial, and position the closs point at the memorized position in step 5, and press S302 on the SS-48 board.
7. Turn the search dial to make least the picture splitting, and press S302 on the SS-48 board.
8. Cofirm that adjustment is performed, and "COMPLETE" is displayed.



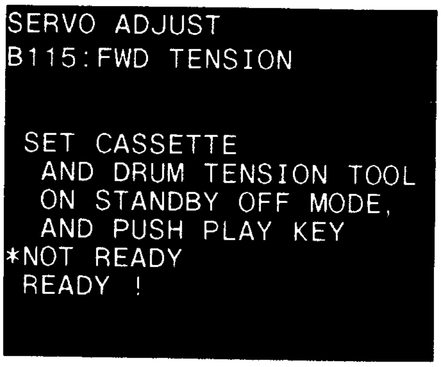
```
SERVO ADJUST
B114:PICTURE SPLITTING


 TURN JOG DIAL FOR
  REDUCING PICTURE
  SPLITTING

 CANCEL:SW303(SS-48)
 FINISH:SW302(SS-48)
```

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor picture, check the drum FG amplifier circuit and drum motor drive circuit.

B115 : FWD TENSION

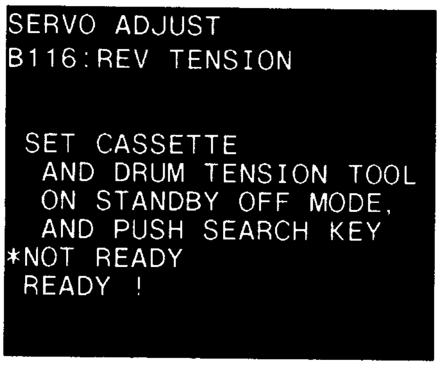
This mode adjusts the FWD back tension.
Use fixtures in this adjustment.
Refer to section 5-19-3 about a method of adjustment.



```
SERVO ADJUST
B115:FWD TENSION

 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE,
  AND PUSH PLAY KEY
*NOT READY
 READY !
```

B116 : REV TENSION

This mode adjusts the REV back tension.
Use fixtures in this adjustment.
Refer to section 5-19-4 about a methed of adjustment.



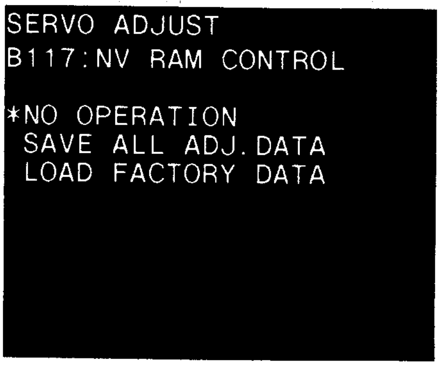
```
SERVO ADJUST
B116:REV TENSION

 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE,
  AND PUSH SEARCH KEY
*NOT READY
 READY !
```

B117 : NV RAM CONTROL

This mode stores the adjustment data to NVRAM.

When having all the adjustment data stored
Move the * mark to “SAVE ALL ADJ. DATA“ with search dial, and press S302 switch on the SS-48 board.

When returning all the adjustment data to the condition that the unit is shipped
Move the * mark to “LOAD FACTORY DATA” with search dial, and press S302 switch on the SS-48 board.



```
SERVO ADJUST
B117:NV RAM CONTROL

*NO OPERATION
 SAVE ALL ADJ.DATA
 LOAD FACTORY DATA
```

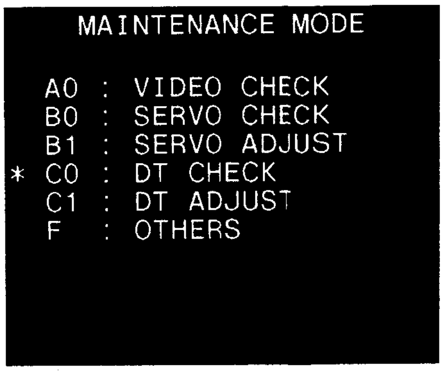
“SAVE COMPLETE” is displayed on the monitor picture after the data are stored.
After “SAVE COMPLETE” was displayed, press S303 on the SS-48 board to return to the menu picture. Or press S303 twice to return to the mode picture.

3-4. DT SYSTEM CHECK MODE (C0 : DT CHECK)

DT system is checked automatically or semiautomatically in this mode.

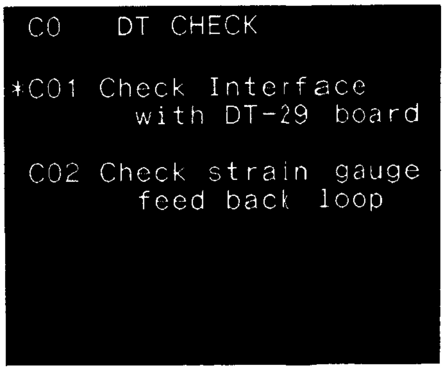
• **Procedure**

1. Turn ON the POWER.
2. Press S302 switch on the SS-48 board.
   Then the unit enters into the maintenance mode. Modes of six kinds are displayed on the monitor picture.
3. Press the search dial to put the unit into the jog mode, then move the * mark to "C0 : DT CHECK" which is a mode displayed in the monitor picture.



```
   MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
  B1 : SERVO ADJUST
* C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

4. Press S302 switch on the SS-48 board.
   Then "C0 : DT CHECK" mode is selected, and menus are displayed on the monitor picture.

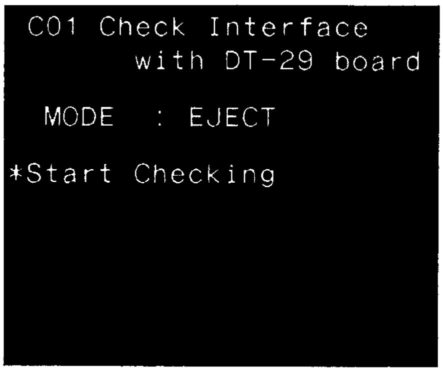


```
 C0    DT CHECK

*C01 Check Interface
          with DT-29 board

 C02 Check strain gauge
          feed back loop
```

5. Move the * mark to a desired menu by the search dial (Jog mode).
6. Press S302 switch on the SS-48 board, and execute the * marked menu.
   (Refer to each page of menu item about a method of check.)
7. When check is finished, press S303 switch on the SS-48 board to return to the menu picture.
8. If there are other menus wishing to be checked, repeat the step 5 to 7.
9. When all the checks are performed, press S303 switch on the SS-48 board to return to the mode picture.
10. Turn OFF the POWER.

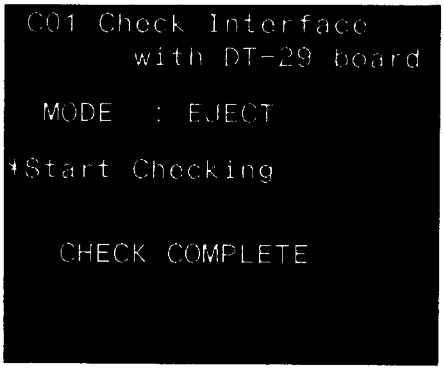
C01 : Check Interface with DT-29 board

This mode checks interface between DT-29 board and DT-30 board.
Press S302 switch on the SS-48 board.



```
 C01 Check Interface
        with DT-29 board

  MODE   : EJECT

*Start Checking
```

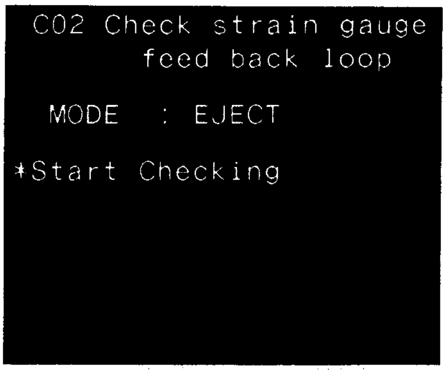
Confirm that check is performed, and “CHECK COMPLETE” is displayed.



```
 C01 Check Interface
        with DT-29 board

  MODE   : EJECT

*Start Checking

   CHECK COMPLETE
```

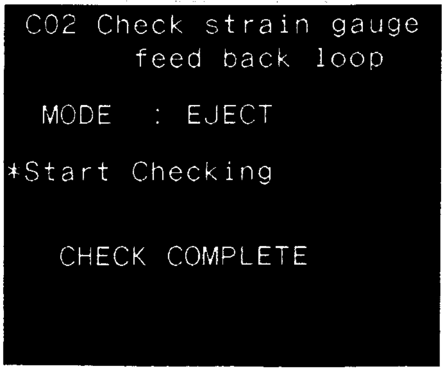
C02 : Check strain gauge feed back loop

This mode checks the strain gauge feed back loop.
Press S302 switch on the SS-48 board.



```
 C02 Check strain gauge
        feed back loop

  MODE   : EJECT

*Start Checking
```

Confirm that check is performed, and “CHECK COMPLETE” is displayed.



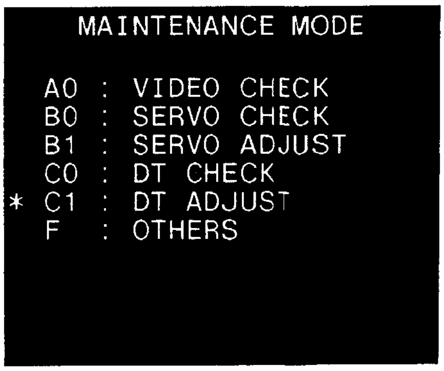
```
 C02 Check strain gauge
        feed back loop

  MODE   : EJECT

*Start Checking

   CHECK COMPLETE
```

3-5. DT SYSTEM ADJUSTMENT MODE (C1 : DT ADJUST)

DT system is adjusted automatically or semiautomatically in this mode.

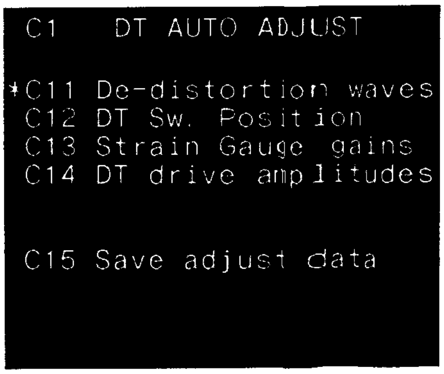
• Procedure

1. Turn OFF the POWER, and set S2-1, S2-2 and S2-5 switch on the DT-30 board to ON.
2. Turn ON the POWER.
3. Confirm that LED D10 on the DT-30 lights for some seconds, and then goes off.
4. Press S302 on the SS-48 board.
   Then the unit enters into the maintenance mode. Modes of six kinds are displayed on the monitor picture.
5. Press the search dial to put the unit into the jog mode, and move the ∗ mark to "C1 : DT ADJUST" which is a mode displayed in the monitor picture.



```
  MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
 B1 : SERVO ADJUST
 C0 : DT CHECK
* C1 : DT ADJUST
 F  : OTHERS
```

6. Press the S302 on the SS-48 board.
   Then "C1 : DT ADJUST" mode is selected, and menus are displayed on the monitor picture.

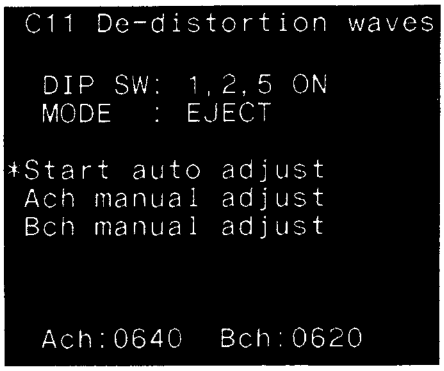


```
C1    DT AUTO ADJUST

*C11 De-distortion waves
 C12 DT Sw. Position
 C13 Strain Gauge gains
 C14 DT drive amplitudes

 C15 Save adjust data
```

7. Move the ∗ mark to a desired menu by the search dial (jog mode).
8. Press S302 switch on the SS-48 board, and execute the ∗ marked menu.
   (Refer to each page of menu about a method of adjustment.)
9. When the adjustment is performed, press S303 on the SS-48 board to return to the menu picture.
   NOTE : To have the NV RAM memorize the adjustment data after an adjustment is performed, execute the "C15 : Save DT adjust data".
10. If there are other menus wishing to be adjusted, repeat the step 7 to 9.
11. When all the adjustments are performed, press S303 switch on the SS-48 board to return to the mode picture.
    NOTE : Have NV RAM memorize the adjustment data.
12. Turn OFF the POWER, and reset S2-1, S2-2 and S2-5 on the DT-30 board to OFF.

C11 : De-distortion waves

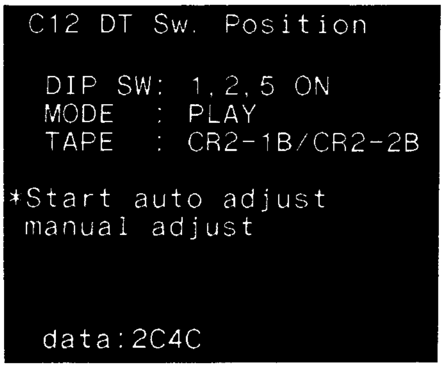
This mode adjusts the de-distortion waves.
Refer to section 9-2-1. De-distortion Waves Adjustment.



```
C11 De-distortion waves

 DIP SW: 1,2,5 ON
 MODE  : EJECT

*Start auto adjust
 Ach manual adjust
 Bch manual adjust


 Ach:0640  Bch:0620
```

C12 : DT Sw. Position

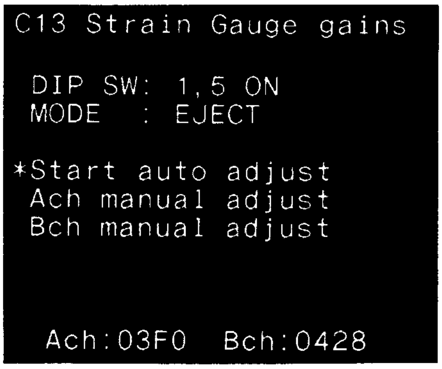
This mode adjusts the DT switching position.
Refer to section 9-2-2. Y DT Switching Position Adjustment.



```
C12 DT Sw. Position

 DIP SW: 1,2,5 ON
 MODE  : PLAY
 TAPE  : CR2-1B/CR2-2B
*Start auto adjust
 manual adjust


 data:2C4C
```

C13 : Strain Gauge gains

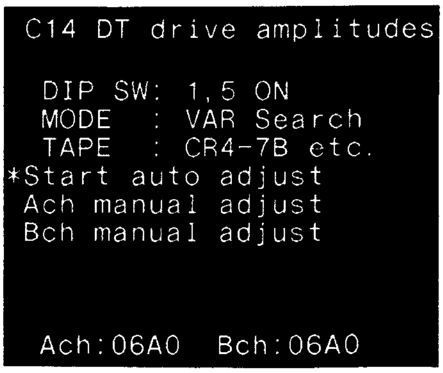
This mode adjusts the gains of the strain gauge.
Refer to section 9-2-5. Strain Gauge/Loop Gain Adjustment.
After performing this adjustment, be sure to perform the adjustment of C14 mentioned below.



```
C13 Strain Gauge gains

 DIP SW: 1,5 ON
 MODE  : EJECT

*Start auto adjust
 Ach manual adjust
 Bch manual adjust


 Ach:03F0  Bch:0428
```

C14 : DT drive amplitudes

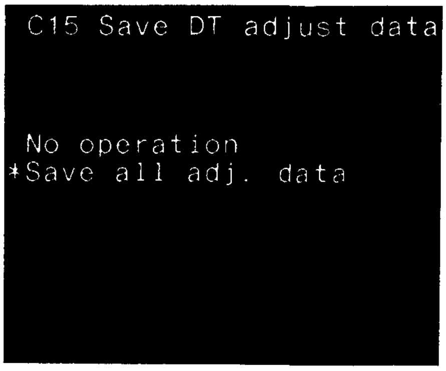
This mode adjusts the DT drive amplitudes.
Refer to section 9-2-5. Strain Gauge/Loop Gain Adjustment.



```
C14 DT drive amplitudes

 DIP SW: 1,5 ON
 MODE  : VAR Search
 TAPE  : CR4-7B etc.
*Start auto adjust
 Ach manual adjust
 Bch manual adjust


 Ach:06A0  Bch:06A0
```

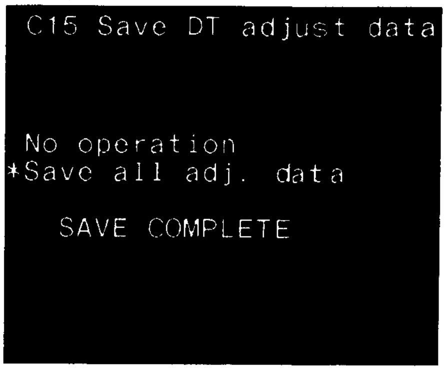
C15 : Save DT adjust data

This mode stores the adjustment data to NVRAM.
Move the * mark to “Save all adj. data” with the search dial, and press S302 switch on the SS-48 board.



```
C15 Save DT adjust data


No operation
*Save all adj. data
```

Confirm that data are stored, and “SAVE COMPLETE” is displayed on the monitor picture.



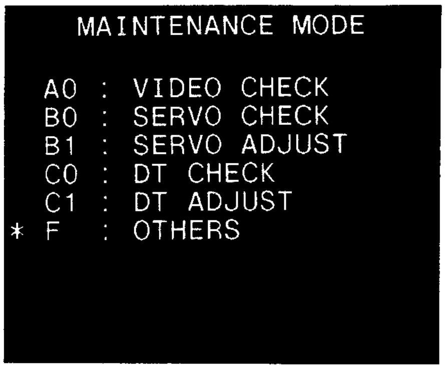
```
C15 Save DT adjust data


No operation
*Save all adj. data

  SAVE COMPLETE
```

3-6. OTHER CHECK MODE (F : OTHERS)

In this mode, it is able to check the ROM version, switch of the control panel/sub control panel and CF data ; besides, TBC microcomputer is initialized.

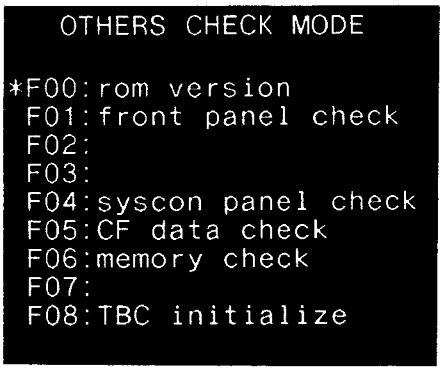
- **Procedure**

1. Press S302 switch on the SS-48 board.
   Then the unit enters into the maintenance mode.
   Modes of six kinds are displayed on the monitor picture.
2. Press the search dial to put the unit into the jog mode, and move the * mark to "F : OTHERS" which is a mode displayed in the monitor picture.



```
   MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
 B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
* F  : OTHERS
```

3. Press S302 switch on the SS-48 board.
   Then "F : OTHERS" mode is selected, and menus are displayed on the monitor picture.



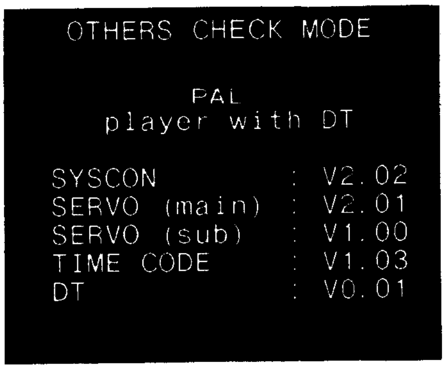
```
  OTHERS CHECK MODE

*F00:rom version
 F01:front panel check
 F02:
 F03:
 F04:syscon panel check
 F05:CF data check
 F06:memory check
 F07:
 F08:TBC initialize
```

4. Move the * mark to a desired menu with the search dial (jog mode).
5. Press S302 switch on the SS-48 board, and execute the * marked menu.
6. When check is performed, press S303 switch on the SS-48 board to return to the menu picture.
7. If there are other menus wishing to be checked, repeat the step 4 to 6.
8. When all the checks are performed, press S303 switch on the SS-48 board to return to the mode picture.

F00 : rom version

In this mode, rom version is displayed.

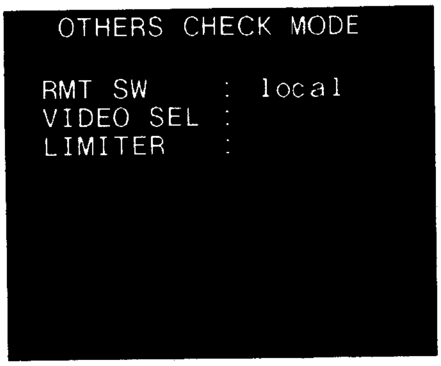
SYSCON : IC7 on the SS-48 board
SERVO (main) : IC604 on the SS-48 board
SERVO (sub) : IC710 on the SS-48 board
TIME CODE : IC403 on the SS-48 board
DT : IC10 on the DT-30 board



```
 OTHERS CHECK MODE

        PAL
   player with DT

SYSCON          : V2.02
SERVO (main)    : V2.01
SERVO (sub)     : V1.00
TIME CODE       : V1.03
DT              : V0.01
```

F01 : front panel check

This mode checks the function of the switch which is on the control panel.

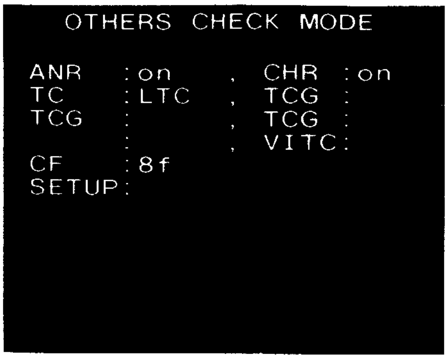


```
 OTHERS CHECK MODE

RMT SW     : local
VIDEO SEL  :
LIMITER    :
```

RMT SW : Operate the LOCAL/REMOTE switch, and confirm that display in the monitor picture changes to the set position.

F04 : syscon panel check

This mode checks the function of the switch which is on the sub control panel.



```
  OTHERS CHECK MODE

ANR   :on    ,  CHR  :on
TC    :LTC   ,  TCG  :
TCG   :      ,  TCG  :
      :      ,  VITC:
CF    :8f
SETUP:
```

ANR : Operate the DOLBY NR switch, and confirm that display in the monitor picture changes to the set position.

CHR : Operate the CHARACTER switch, and confirm that display in the monitor picture changes to the set position.

TC : Operate the TC switch, and confirm that display in the monitor picture changes to the set position.

CF : Operate the CAPSTAN LOCK switch, and confirm that display in the monitor picture changes to the set position.

SETUP : Press the SETUP SET switch, and confirm that its mode is displayed in the monitor picture.

F05 : CF data check

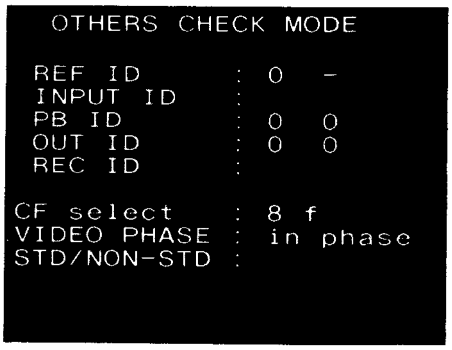
REF ID : The field number for reference TBC is displayed.

PB ID : The field number of playback video signal in playback mode is displayed, and the difference between the field number and REF ID is displayed. (field number : 0 through 7)

OUT ID : The field number of the composite video signal from the VTR is displayed, and the difference between the field number and REF ID is displayed. (field number : 0 through 7)

CF select : The CF select of the VTR is displayed.

VIDEO PHASE : Whether the video phase by CF ID is IN phase or OUT phase is displayed. When the video phase is OUT phase, the output video signal is shifted H by 70 ns. (VISC has nothing to do with this display.)



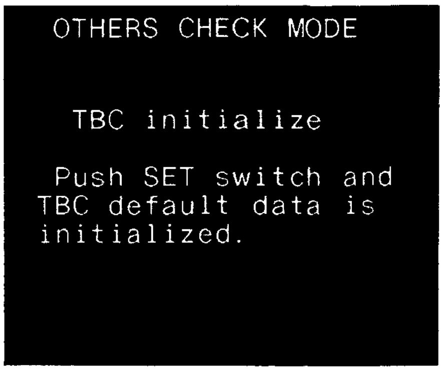
```
  OTHERS CHECK MODE

 REF ID         :  0  -
 INPUT ID       :
 PB ID          :  0  0
 OUT ID         :  0  0
 REC ID         :

CF select       :  8 f
VIDEO PHASE     :  in phase
STD/NON-STD     :
```

F06 : memory check

factory use.

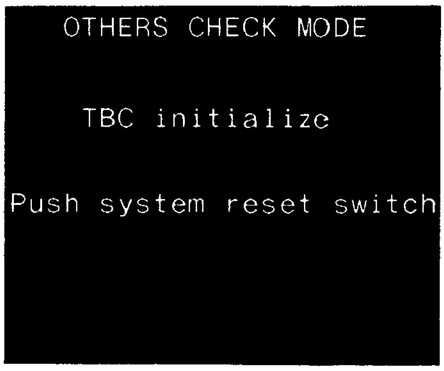
F08 : TBC initialize

TBC microcomputer is initialized in this mode.
Press the SET switch on the SS-48 board.



```
  OTHERS CHECK MODE


   TBC initialize

  Push SET switch and
 TBC default data is
 initialized.
```

Confirm that initializing was performed, and "Push system reset switch" is displayed.



```
  OTHERS CHECK MODE


   TBC initialize


Push system reset switch
```

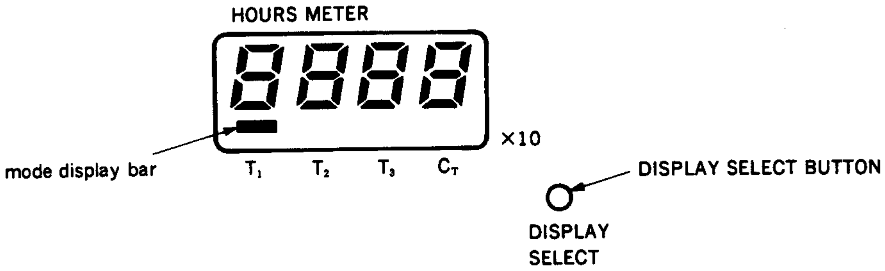
This unit operates with the preset data by pressing the system reset switch or turning on the power again.

SECTION 4
INSPECTION AND MAINTENANCE

4-1. HOURS METER

The Hours Meter is installed on the sub control panel.
It is recommended to perform inspection and maintenance based on the Hours Meter.

NOTE: The Hours Meter has a built-in battery. The Hours Meter should be replaced every five years.
When replacing the Hours Meter, it is recommended to note down the total hours and times displayed for inspection and maintenance later.

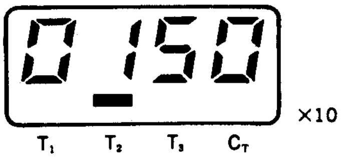


The Hours Meter has four kinds of display modes. The total operation hours or total times of operations is displayed in each mode.
To select the display mode, push the DISPLAY SELECT button at the side of the Hours Meter.

NOTE: The actual operation hours or times are equal to the displayed value multiplied by 10.

mode	contents	The unit operation status in every mode.	
		light a mode display bar	**blink a mode display bar**
T_1 : OPERATION	Displays the total hours that the power of the unit has been turned on.	POWER OFF	POWER ON
T_2 : DRUM RUNNING	Displays the total rotation hours of the drum in threading end mode.	• POWER OFF • POWER ON in mode other than threading end.	Drum is rotating in threading end mode.
T_3 : TAPE RUNNING	Displays the total running hours of the tape in fast forward, rewind, playback and search modes (except for stop and standby).	• POWER OFF • POWER ON in mode other than fast forward, rewind, playback or search.	Tape is running in fast forward, rewind, playback or search.
C_T : THREADING	Displays the total times of threading and unthreading operations.	———	Every time if the POWER is ON or OFF.

Example: This display indicates that the total rotation hours of the drum is 1500 hours in threading end mode.



4-2. MAINTENANCE AFTER REPAIRS

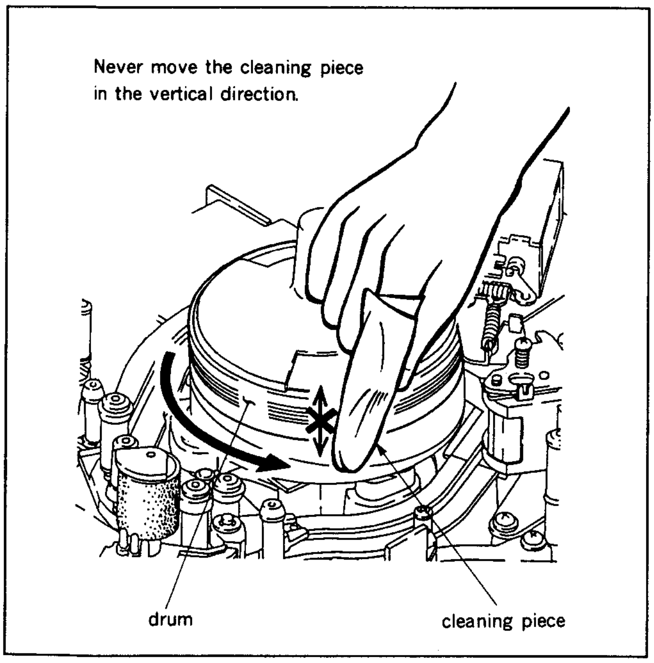
Perform the following maintenance after repairs regardless of the unit operating hours.

1. Video heads and stationary heads cleaning. (Refer to Section 4-2-1. and 4-2-2.)
2. Tape movement area cleaning. (Refer to Section 4-2-3.)

NOTE :Wait until the cleaning fluid evaporates completely before inserting a cassette tape.

4-2-1. Cleaning Procedure of Video Head

Press a cleaning piece moistened with cleaning fluid and turn a drum slowly with hand.



NOTE : • Never move the cleaning piece in the vertical direction of a head tip.
- Clean the head with the power off.

4-2-2. Cleaning Procedure of Stationary Heads

Clean with a cleaning piece moistened with cleaning fluid.

4-2-3. Cleaning Procedure of Tape Movement Areas

Wipe the tape bearing surfaces (of a tape guide, drum, capstan and pinch roller) with a cleaning piece moistened with cleaning fluid.

4-3. PERIODIC MAINTENANCE TABLE

It is recommended to perform the periodic maintenance in order to obtain correct function and higher performance, and also to extend the life of tape and unit.

○ mark : Execute
△ mark : Confirm. if not, replace or adjust

Perform the periodic maintenance referring to T2 : DRUM RUNNING mode shown in hours meter.

Item	750H	1500H	2250H	3000H	3750H	4500H	5250H	6000H	Replacement	Q'ty	Remarks
Tape running system											
Tape running surface cleaning	○	○	○	○	○	○	○	○			
Tape running confirmation/adjustment	△	△	△	△	△	△	△	△			
Cleaning roller replacement	○	○	○	○	○	○	○	○	X-3675-858-1 ROLLER SUB ASSY, C	1pc	
Upper drum assembly replacement	○	○	○	—	○	○	○	—	A-8260-250-A UPPER DRUM ASSY, DBR-34-R	1pc	(Note 1)
Servo automatic adjustment (B110) execute	○	○	○	○	○	○	○	○			
Servo automatic adjustment (B111) execute	○	○	○	○	○	○	○	○			
Video tracking confirmation/adjustment	△	△	△	△	△	△	△	△			
Drum assembly replacement	—	—	—	○	—	—	—	○	A-8260-249-A DRUM ASSY, DBH-34A-R	1pc	
Tape guide roller rotation confirmation/ replacement	△	△	△	△	△	△	△	△	X-3166-431-1 ROLLER (TG-6) ASSY, TAPE X-3166-037-1 ROLLER (M) ASSY, TAPE X-3166-052-1 ROLLER (S-T) ASSY, TAPE X-3166-320-1 TG-5 ASSY X-3166-386-1 TG-4 (IP) ASSY	1pc 4pcs 2pcs 1pc 1pc	
Tape guide flange wearing confirmation/ replacement	△	△	△	△	△	△	△	△	3-173-172-01 FLANGE, LOWER 3-173-176-01 NUT, ADJUSTMENT 3-174-315-01 FLANGE (UPPER) 3-174-316-01 FLANGE (LOWER)	2pcs 4pcs 5pcs 4pcs	
Bearing for cleaning roller replacement	—	○	—	○	—	○	—	○	3-669-443-01 BEARING, BALL	2pcs	
Audio/TC head replacement	—	—	—	○	—	—	—	○	8-825-776-22 HEAD, PS244-2103E	1pc	
CTL head replacement	—	—	—	○	—	—	—	○	8-825-776-41 HEAD, PS244-21C	1pc	
Drive system											
Pinch roller replacement	○	○	○	○	○	○	○	○	X-3166-040-3 ARM ASSY, PINCH	1pc	
Brake shoe replacement	—	—	—	○	—	—	—	○	X-3717-205-1 LINING ASSY, C	2pcs	
Drum ground shaft replacement	—	—	—	○	—	—	—	○	X-3166-376-1 GROUND ASSY, SHAFT	1pc	
Pinch solenoid replacement	—	—	—	○	—	—	—	○	1-454-338-00 SOLENOID	1pc	
Cleaning solenoid replacement	—	—	—	○	—	—	—	○	1-454-372-11 SOLENOID	1pc	
Brake solenoid replacement	—	—	—	○	—	—	—	○	1-454-417-41 SOLENOID	2pcs	
Reel motor replacement	—	—	—	○	—	—	—	○	A-6737-207-A RM ASSY	2pcs	
Capstan motor replacement	—	—	—	○	—	—	—	○	8-835-445-01 MOTOR, DC SCV-0301A	1pc	
Threading motor replacement	—	—	—	○	—	—	—	○	8-835-179-01 MOTOR, DC MCB2B15	1pc	
Mechanical operation confirmation											
Abnormal noise	△	△	△	△	△	△	△	△			
Servo automatic adjustment (B101) execute	○	○	○	○	○	○	○	○			
Servo automatic adjustment (B109) execute	○	○	○	○	○	○	○	○			
Servo check menu execute	○	○	○	○	○	○	○	○			
FWD back tension confirmation/adjustment	△	△	△	△	△	△	△	△			
REV back tension confirmation/adjustment	△	△	△	△	△	△	△	△			
Cassette compartment operation confirmation	△	△	△	△	△	△	△	△			
Reel brake clearance confirmation	—	—	—	△	—	—	—	△			
Reel brake release amount confirmation	—	—	—	△	—	—	—	△			
Electrical confirmation											
System control operation confirmation	△	△	△	△	△	△	△	△			
Audio specifications confirmation	△	△	△	△	△	△	△	△			
Video specifications confirmation	△	△	△	△	△	△	△	△			

Note 1 : The video head life is greatly affected by operating ambient condition and tape.

Note 2 : It is recommended to replace the fun motor on the connector panel every 10,000 hours is operation mode shown in hours meter.

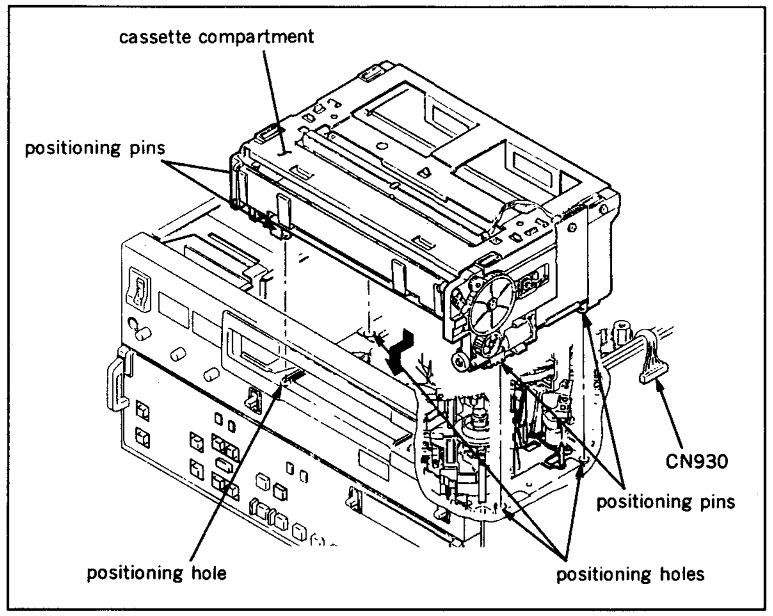
SECTION 5
REPLACEMENT OF MAJOR PARTS

5-1. GENERAL INFORMATION FOR PART REPLACEMENT AND ADJUSTMENT

1. CASSETTE COMPARTMENT
   When performing part replacement and mechanical adjustment, remove a cassette compartment from the unit unless otherwise specified.

Removing procedure :

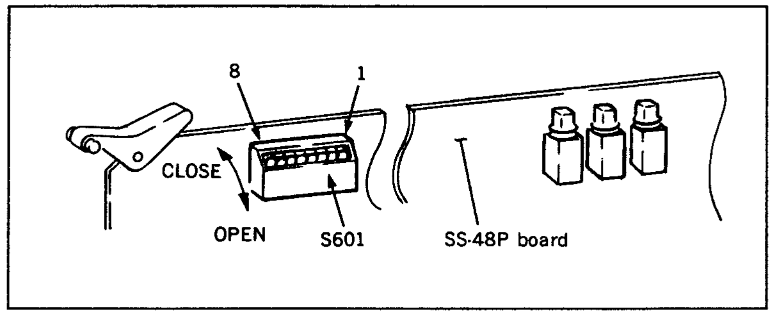
1) Remove three fixing screws of an upper panel, and remove the upper panel.
2) Disconnect a connector of a cassette compartment.
3) Loosen two fixing screws of a cassette compartment stay. These fixing screws have retainers, then they can not remove from the cassette compartment stay.
4) Remove the cassette compartment from the unit.



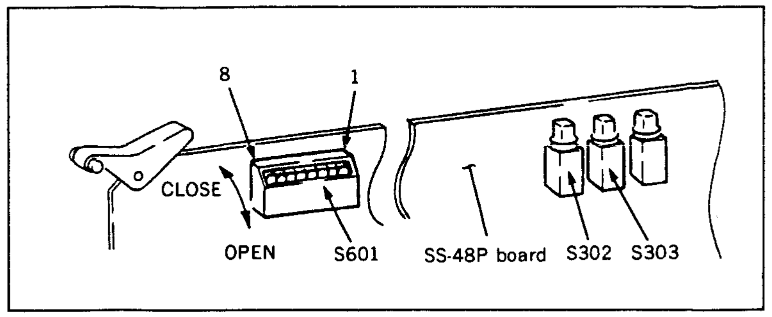
2. TO OPERATE THE UNIT WITHOUT INSTALLING CASSETTE COMPARTMENT
   When disconnect a connector of the cassette compartment, the protection circuit operates. However the unit can operate by performing the following procedures, even if the cassette compartment is removed from the unit.

1) Turn the POWER to OFF.
2) Put Bit4 of S601 on SS-48P board in CLOSE state.
   By this operation, the protection circuit stops its operation, and the unit can operate normaly without inserting a cassette tape or without installing the cassette comprtment.

Note : After adjustment is completed, be sure to put Bit4 of S601 on SS-48P board in OPEN state.



3. MAINTENANCE MENU
   This unit has a Maintenance Menu mode for video system and servo system operation check and adjustment.
   Check and adjustment procedures are described in this manual, perform according to this procedures.
   In maintenance menu mode, the following switches are mainly used.



Bit4 of S601 :
This switch is used in SERVO ADJUST mode.
Before performing the SERVO ADJUST mode, put this switch in CLOSE state.
After the SERVO ADJUST mode is completed, put it in OPEN state.
When this switch is in CLOSE state, the protection circuit stops its operation.

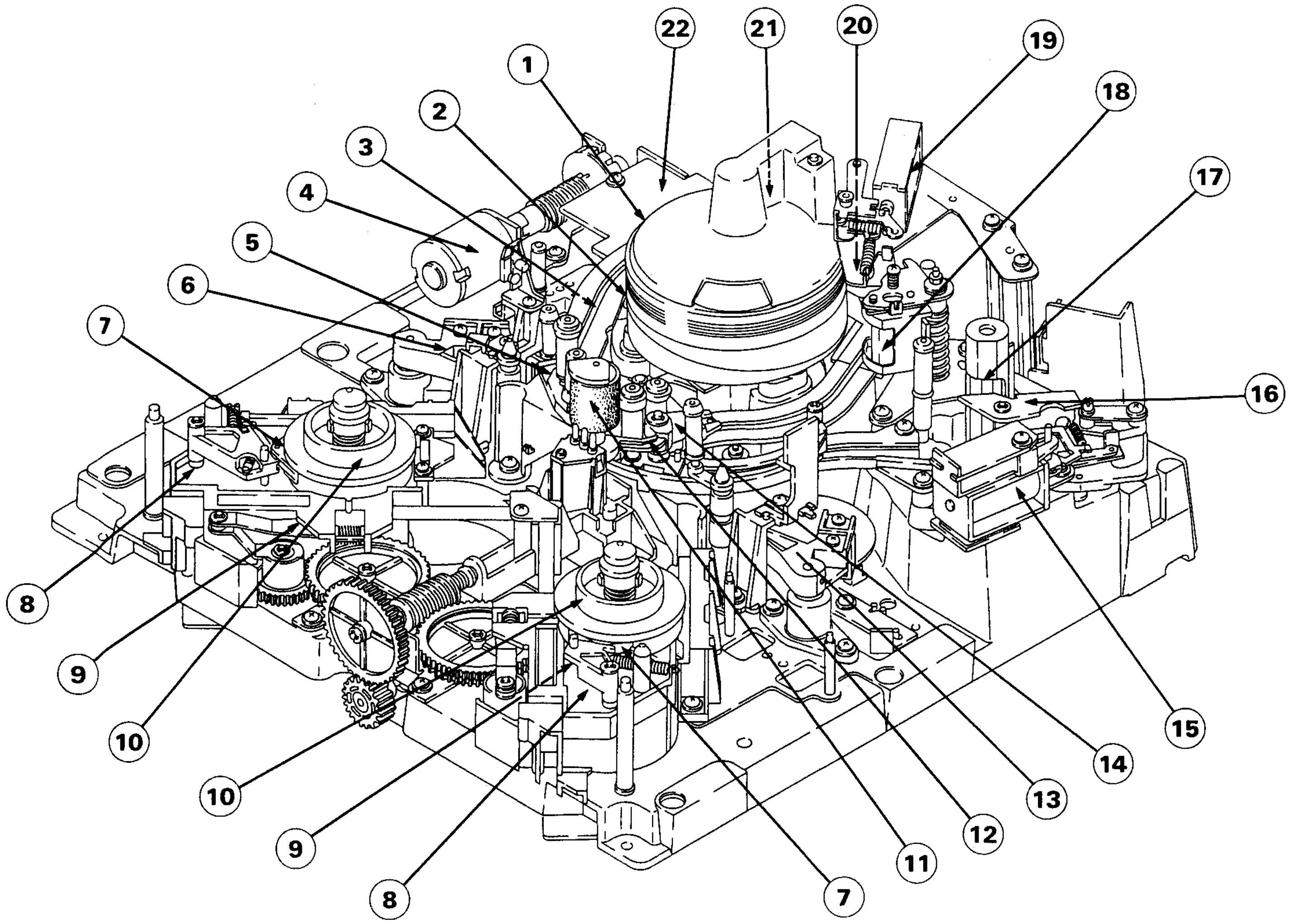
Bit7 of S601 :
This switch is used in SERVO CHECK mode.
Before performing the SERVO CHECK mode, put this switch in CLOSE state.
After the SERVO CHECK mode is completed, put it in OPEN state.

S302 :
Push this switch, then mode, menu or sub-menu of the SERVO CHECK/SERVO ADJUST is executed.

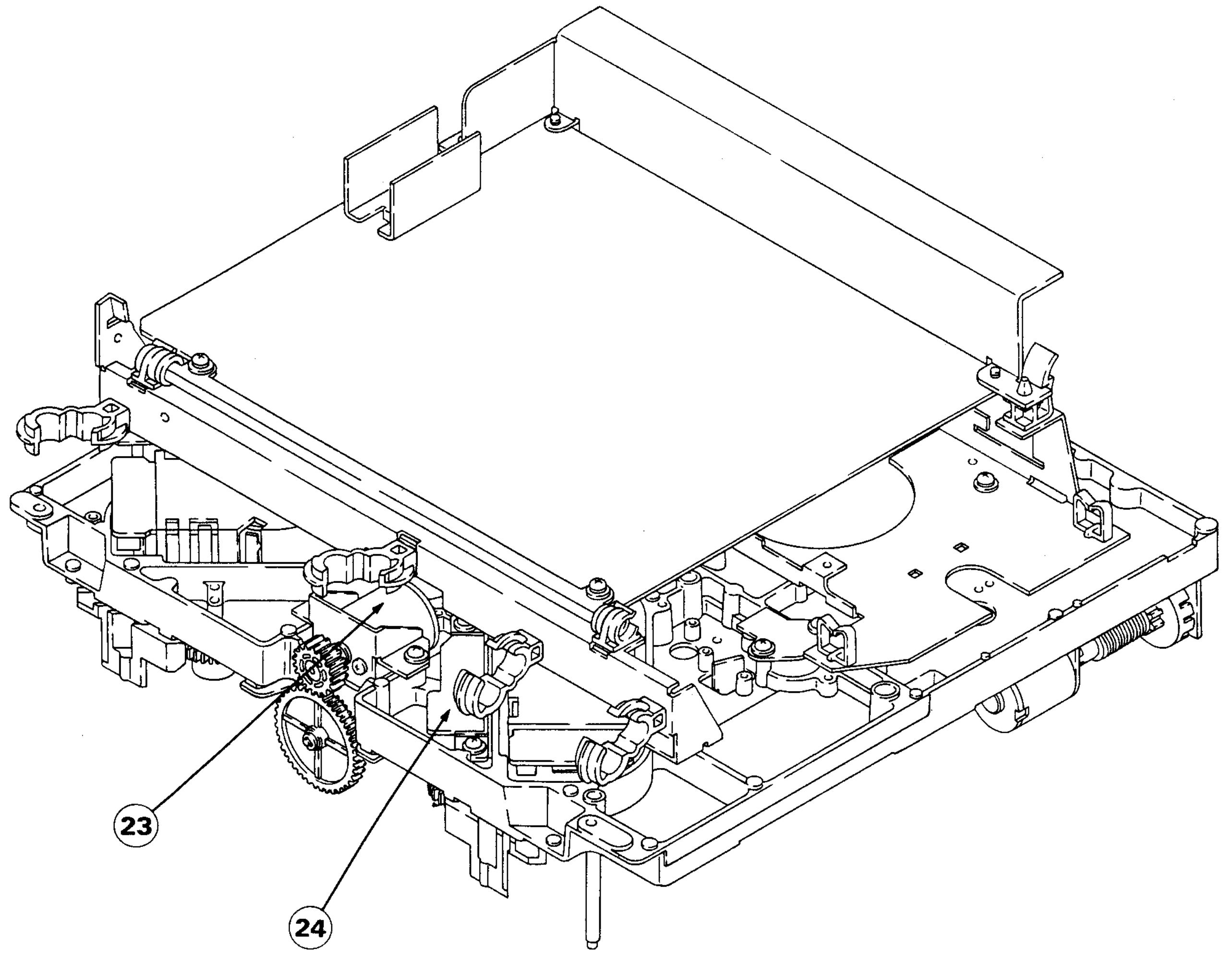
S303 :
Push this switch, then menu or sub-menu of the SERVO CHECK/SERVO ADJUST is returned to the previous state.

4. INDEX FOR REPLACEMENT PART
(alphabetical order)

(Top portion of the unit)



(Bottom portion of the unit)



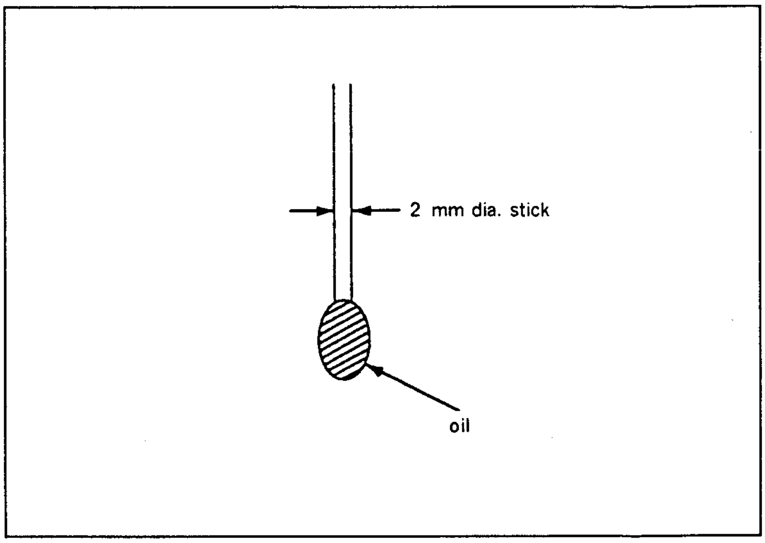
No.	Description	Section No.	Page
18	Audio/TC head	5-26	5-117
7	Brake lining assembly	5-7	5-22
17	Capstan motor	5-27	5-120
20	Cleaning roller assembly	5-6	5-20
19	Cleaning solenoid	5-9	5-30
21	CTL head	5-25	5-115
2	Drum assembly	5-3	5-11
16	Pinch press block	5-21	5-100
11	Pinch roller assembly	5-5	5-18
15	Pinch solenoid	5-22	5-101
12	P slider assembly	5-18	5-69
9	Reel motor	5-12	5-41
8	Reel motor plate	5-11	5-38
10	Reel table	5-10	5-31
5	S slider assembly	5-16	5-68
6	S tension regulator arm assembly	5-19	5-72
–	Tape guide	5-8	5-26
22	Threading gear	5-24	5-110
4	Threading motor	5-15	5-59
3	Threading ring	5-23	5-106
14	T slider assembly	5-17	5-65
13	T tension regulator arm assembly	5-20	5-91
1	Upper drum assembly	5-2	5-5
23	Reel position motor	5-13	5-56
24	Reel position sensor	5-14	5-58

5. OIL

Apply only the specified oil when oiling is required for replacing parts and/or adjustment. If a different oil is used, major malfunctions may be caused due to differences in oil viscosity and ingredients.

SONY part number : 7-661-018-18

If oil is used that has been mixed with dust, shafts and bearings may be damaged, causing major malfunctions.
One drop of oil is defined as follows :
About the amount that will adhere to the end of a stick 2 mm in diameter, as shown in the figure.



6. GREASE

SONY part number : 7-662-001-41
(Molyton grease, No320)
SONY part number : 7-662-010-04
(Grease, SGL-505)

Smear only the specified grease product to sliding part. If a different grease is used, major malfunctions may be caused due to differences in viscosity and ingredients.
Major malfunctions may also be caused by using grease that has been mixed with dust.

Amounts of grease to smear
Smear just enough grease to create a thin film on the surface of the part. Any grease that adheres to other surrounding parts must be removed with gauze or soft cloth.

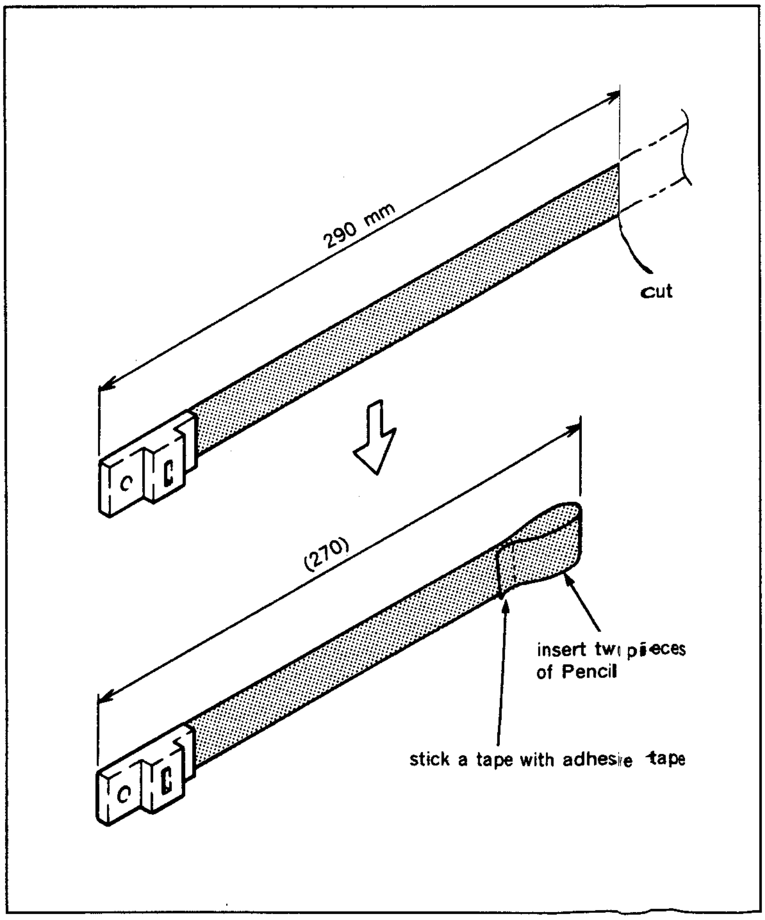
7. TENSION MEASUREMENT TAPE

Prepare the following tool :

J-6327-930-A

This tension measurement tape uses a S tension regulator arm operating position adjustment, T tension regulator arm operating position adjustment and S tension sensor sensitivity adjustment.
How to create the tension measurement tape.

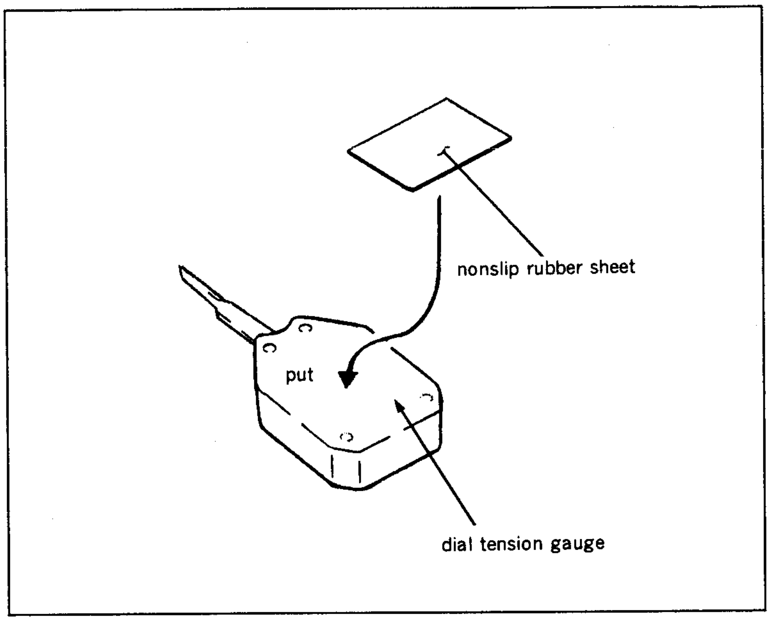
1) Cut a video tape as shown in the figure.
2) Make a loop while inserting two pieces of pencil as shown in the figure, and stick a video tape.



8. NONSLIP RUBBER SHEET

SONY part number : J-6327-980-A

This rubber sheet prevents to dial tension gauge from slipping on a reference plate. It is recommended to use this rubber sheet when S and T tension regulator arm operating position adjustments, and S and T tension sensor sensitivity adjustments are performed.


nonslip rubber sheet
put
dial tension gauge

5-1-1. Index for Adjustment Item
(alphabetical order)
(except tape path system alignment)

Adjustment Item	Section No.	Page
Audio/TC head zenith adjustment	6-2	6-4
Capstan FG duty adjustment	5-27-2	5-123
Capstan speed adjustment	5-27-3	5-125
Capstan motor operation check	5-27-1	5-122
Cassette pillar (S) height adjustment	5-10-1	5-32
Cleaning roller block position adjustment	5-6-1	5-21
Brush position adjustment	4-4-1	5-19
Drum motor operation check	5-3-1	5-15
FWD back tension adjustment	5-19-3	5-84
Pinch solenoid position adjustment	5-22-1	5-104
Reel brake clearance check	5-7-1	5-24
Reel brake release amount adjustment	5-7-2	5-25
Reel FG duty adjustment	5-12-3	5-47
Reel motor operation check	5-12-2	5-46
Reel motor shaft slantness adjustment	5-12-1	5-44
Reel position motor operation check	5-13-1	5-57
Reel rotation detector position adjustment	5-10-3	5-36
Reel table height adjustment	5-10-2	5-34
REV back tension adjustment	5-19-4	5-87
S reel offset/friction adjustment	5-12-4	5-48
S reel torque adjustment	5-12-5	5-50
S tension regulator arm operating position adjustment	5-19-1	5-74
S tension sensor sensitivity adjustment	5-19-2	5-78
Threading motor operation check	5-15-1	5-60
T reel offset/friction adjustment	5-12-6	5-52
T reel torque adjustment	5-12-7	5-54
T tension sensor sensitivity adjustment	5-20-2	5-97
T tension regulator arm operating position adjustment	5-20-1	5-93
Upper drum eccentricity adjustment	5-2-1	5-9

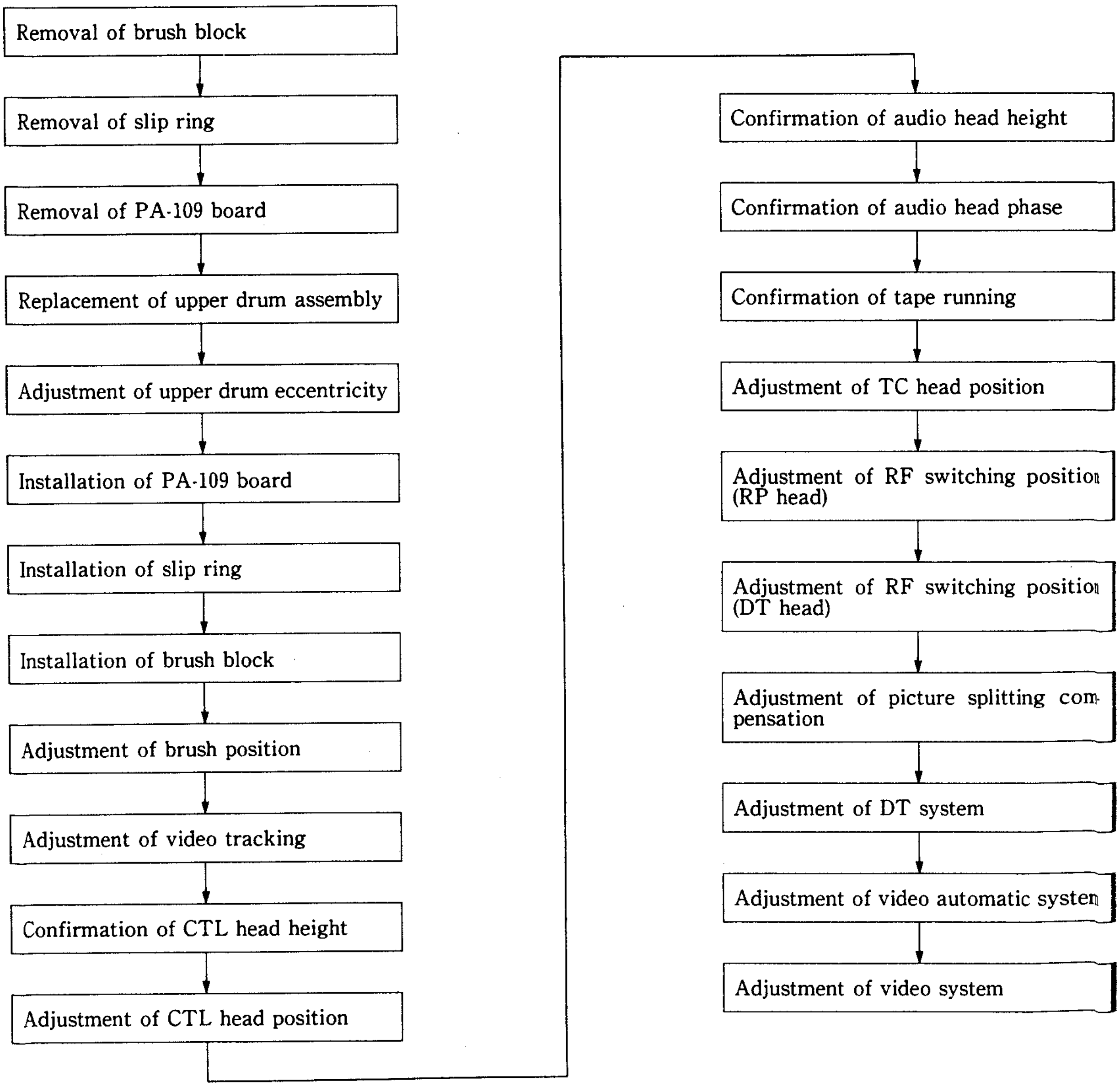
5-2. UPPER DRUM ASSEMBLY REPLACEMENT

- The upper drum assembly is a periodic replacement part. It is recommended to replaced periodically based on the periodic maintenance table.
- When the video heads are worn or damaged, replace an upper drum assembly.
- When the upper drum assembly is removed, if a spacer is placed on the flange, be sure to leave it in place on the flange. If the spacer is lost or replaced with one of a difference thickness, the height of the video head from its reference surface will be changed, making it impossible to get interchangiability.

Tools

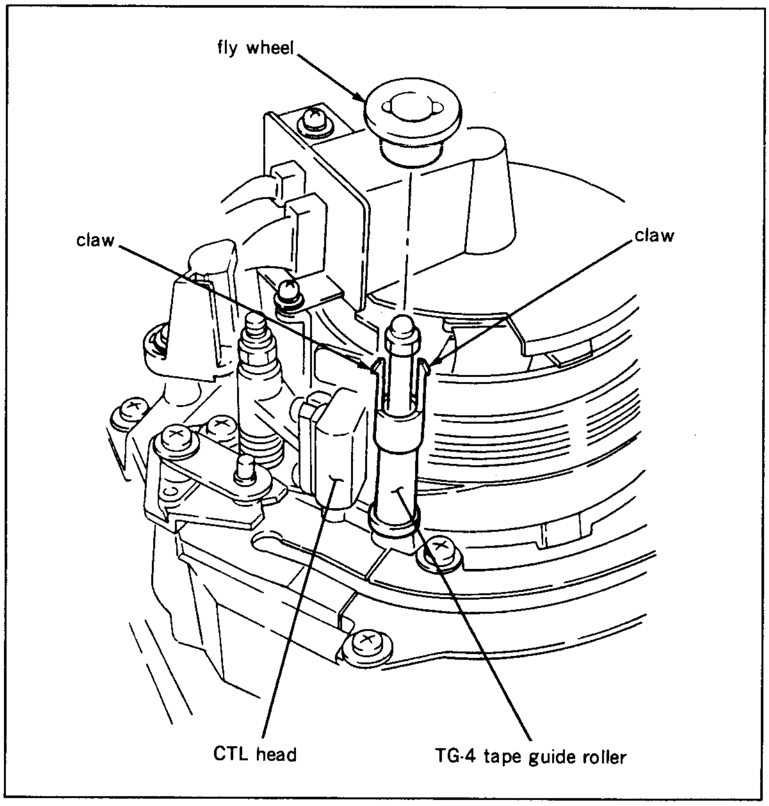
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

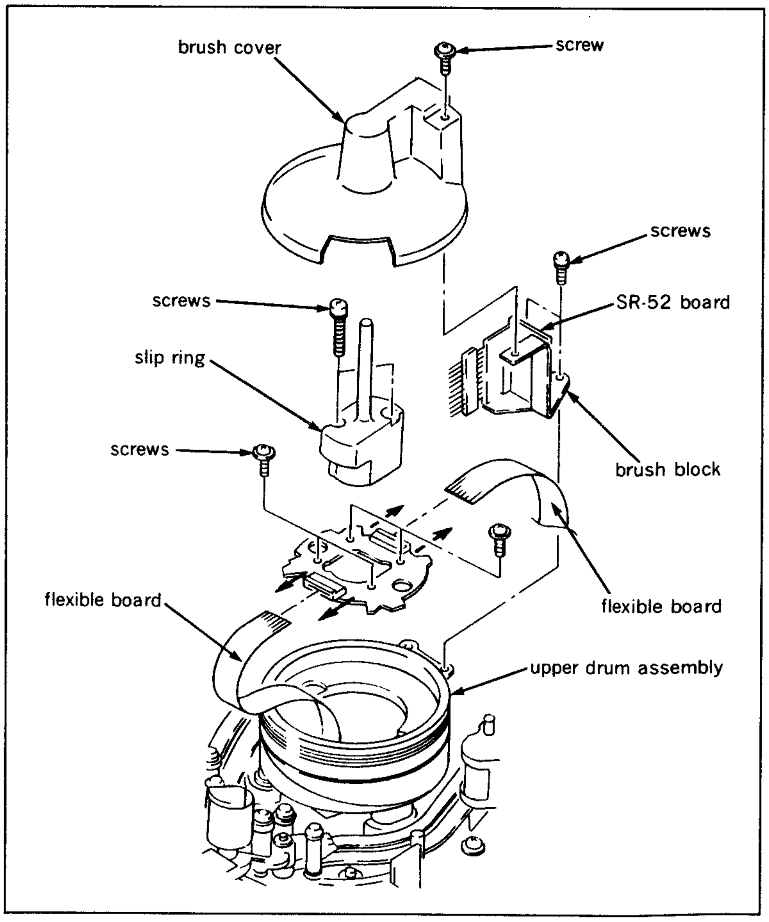

Removal of brush block
Removal of slip ring
Removal of PA-109 board
Replacement of upper drum assembly
Adjustment of upper drum eccentricity
Installation of PA-109 board
Installation of slip ring
Installation of brush block
Adjustment of brush position
Adjustment of video tracking
Confirmation of CTL head height
Adjustment of CTL head position
Confirmation of audio head height
Confirmation of audio head phase
Confirmation of tape running
Adjustment of TC head position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)
Adjustment of picture splitting compensation
Adjustment of DT system
Adjustment of video automatic system
Adjustment of video system

Removal

1. Hold claws of the upper part of a TG-4 tape guide roller using tweezers, and remove a fly wheel.


fly wheel
claw
claw
CTL head
TG-4 tape guide roller

2. Disconnect two connectors CN961 and CN962 on SR-52 board of a brush block.
3. Remove a fixing screw as shown in the figure, and remove a brush cover.
4. Remove two screws holding the brush block to the poles, and remove the brush block.
5. Remove two screws as shown in the figure, and remove a slip ring.
6. Push two connector housings on the printed circuit board in an upper drum assembly in the direction shown in the figure respectively, and remove two flexible boards.
7. Remove four screws holding the printed circuit board in the upper drum assembly, and lift the printed circuit board straight up to remove.


brush cover
screw
screws
SR-52 board
screws
slip ring
screws
brush block
flexible board
flexible board
upper drum assembly

8. Remove two screws holding the upper drum assembly, and lift the upper drum assembly straight up to remove.

Note : Never contact the upper drum assembly to the TG-4, CTL head, stationary guide and cleaning roller when removing the upper drum assembly.

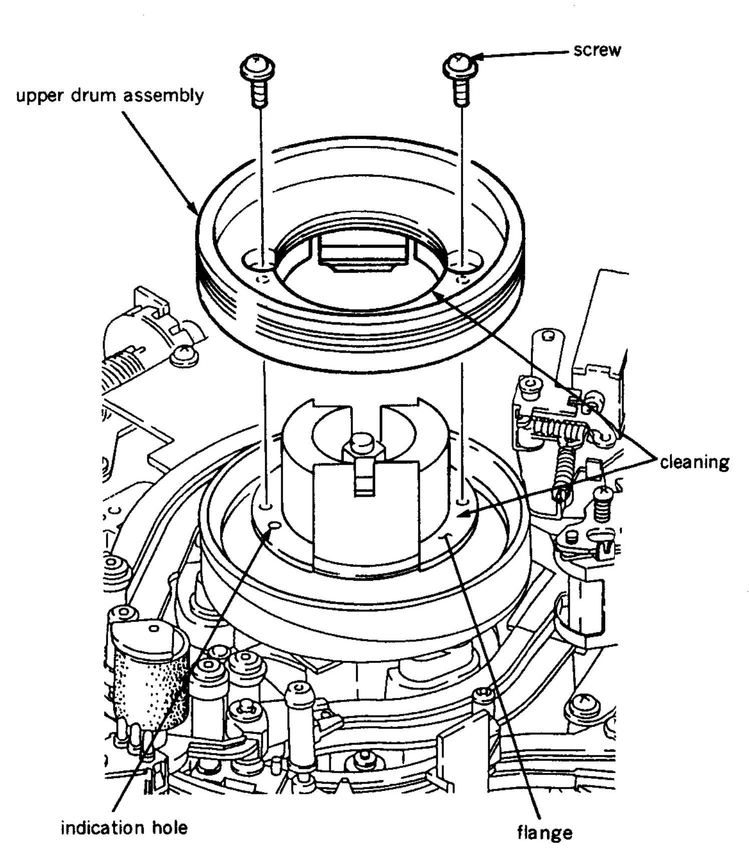
Installation

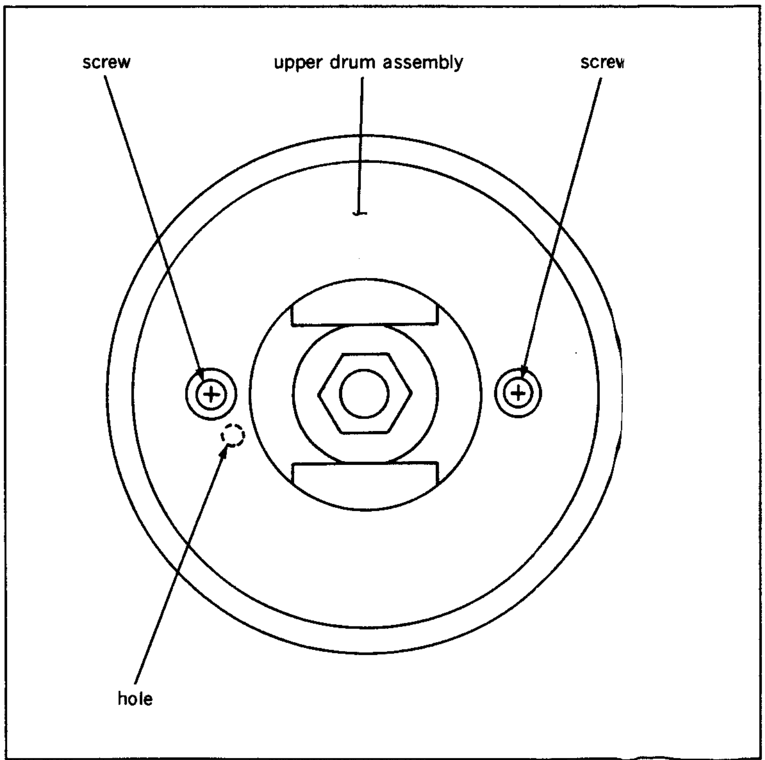
9. Clean the flange surface of a lower drum and the installation surface of a new upper drum assembly with a cleaning piece moistened with cleaning fluid.
10. As shown in the figure, place A-mark of the upper drum assembly as indication hole on the flange and put it on the flange, then secure it with two screws and washers snugly, but do not tighten.

Note 1 : When placing the upper drum asembly on the lower drum, never make a scratch or otherwise damage on the tape running surface and video heads of the upper drum assembly.

Note 2 : Never contact the upper drum assembly to the TG-4, CTL head, stationary guide and cleaning roller when installing the upper drum assembly on the flange.

Note 3 : When placing the upper drum assembly on the flange, pay particular attention to install in correct position.





Adjustments after replacement

11. Perform upper drum eccentricity adjustment. (Refer to Section 5-2-1.)
12. Place ACH-mark of the printed circuit board as A-mark indicated on the upper drum assembly and put it on the upper drum assembly.

Note :When placing the printed circuit board on the upper drum assembly, pay particular attention to install in correct position.

13. Secure the printed circuit board with four screws (P2×8) and washers to the upper drum assembly.
14. Insert the flexible printed circuit boards into the connector housings respectively, and push the housings to the opposite direction of the arrow to lock them.
15. Install the slip ring with two screws (PS2×12).
16. Install the brush block with two screws (PS2.6×5) to the poles snugly, but do not tighten.
17. Perform slip ring position adjustment. (Refer to Section 5-4-1.)
18. Install the brush cover.
19. Connect connectors CN961 and CN962 to SR-52 board of brush block.
20. Perform video tracking adjustment. (Refer to Section 6-4.)
21. Perform CTL head height adjustment. (Refer to Section 6-5.)
22. Perform CTL head position adjustment. (Refer to Section 6-6.)
23. Perform confirmation of audio head height. (Refer to Section 6-7.)
24. Perform confirmation of audio head phase. (Refer to Section 6-8.)
25. Perform confirmation of tape running. (Refer to Section 6-3.)
26. Perform TC head position adjustment. (Refer to Section 6-10.)
27. Align two claws of the upper part of the TG-4 tape guide roller and two grooves of the fly wheel, then install the fly wheel to the TG-4 tape guide roller.
28. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
29. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)
30. Perform picture slitting compensation adjustment. (Refer to Section 6-15.)
31. Perform DT system adjustment.
32. Perform video automatic adjustment.
33. Perform video system adjustment.

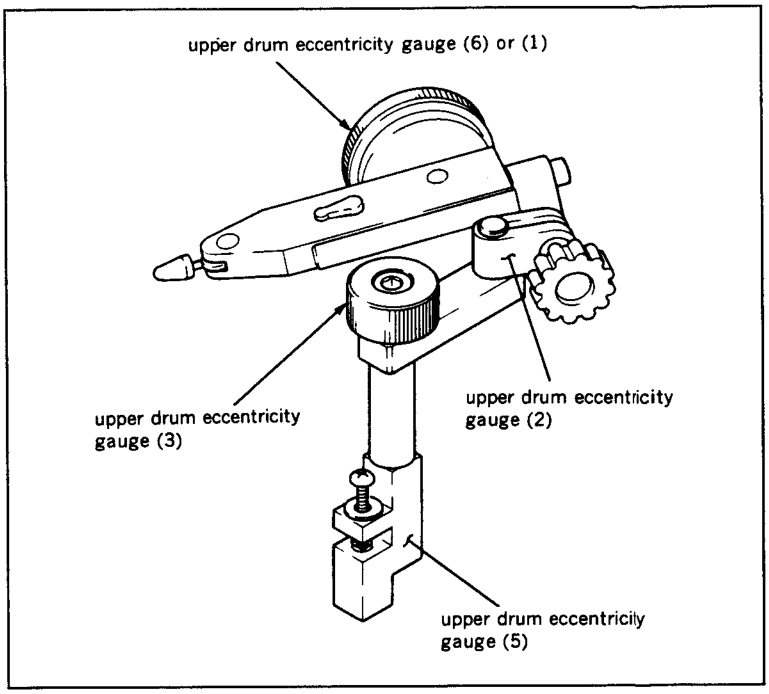
5-2-1. Upper Drum Eccentricity Adjustment

- Be sure to perform an upper drum eccentricity adjustment, when the upper drum is replaced.

Tools

Upper drum eccentricity gauge(2)	J-6001-830-A
Upper drum eccentricity gauge(3)	J-6001-820-A
Upper drum eccentricity gauge(5)	J-6087-000-A
Upper drum eccentricity gauge(6)	J-6325-530-A
or(1)	J-6001-840-A
Cleaning piece	2-034-697-00
Cleaning fluid	9-919-573-01

Assemble the upper drum eccentricity gauges as shown in the figure.


upper drum eccentricity gauge (6) or (1)
upper drum eccentricity gauge (3)
upper drum eccentricity gauge (2)
upper drum eccentricily gauge (5)

For reference :

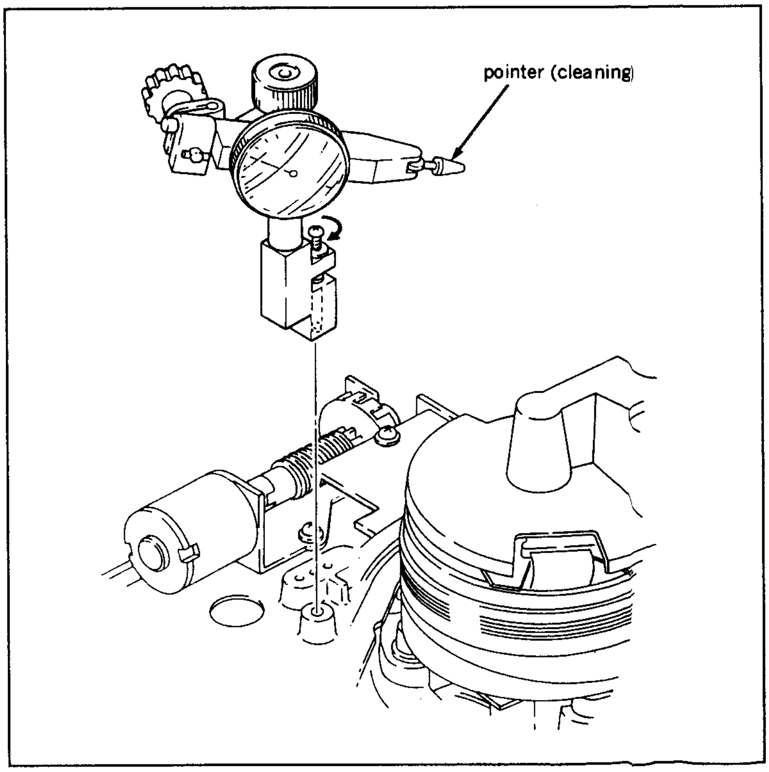
Drum eccentricity adjustment gauge (J-6080-038-A) and dial gauge holder (J-6080-039-A) are able to use for the upper drum eccentricity adjustment instead of to use drum eccentricity gauges (2), (3) and (5).

Adjustment

1. Clean the pointer of the assembled upper drum eccentricity gauges with a cleaning piece moistened with cleaning fluid.

Note : The tape running surface of the upper drum may be damaged if the gauge is used with dirt or dust adhering to the pointer.

2. Install the assembled upper drum eccentricity gauges to the installing screw hole shown in the figure, which is on the cassette side of full erase head base.


pointer (cleaning)

3. Adjust the position of the gauge so that the pointer is positioned about 5 mm away from the upper edge of the upper drum assembly.

Note : Pay particular attention not to touch the pointer to the video heads.

4. Turn the upper drum slowly in the clockwise direction. Make sure that the pointer deviation indicated in one full turn of the upper drum satisfies the specification.

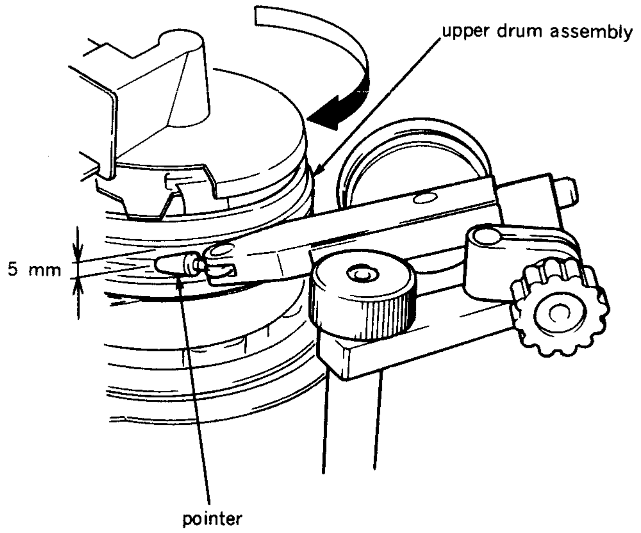
Specification : 3 μm or less.

If the specification is satisfied, perform step (6) and later.
If the specification is not satisfied, perform step (5) and later.

5. Perform if the specification is not satisfied :
   (1) Turn the upper drum slowly in the clockwise direction, and make sure that the amount of the pointer deviation.
   (2) Turn the upper drum slowly in the clockwise direction, and stop the turning at the place where the least pointer deviation is indicated.
   (3) Adjust the position of the upper drum to about one-half the amount of the pointer deviation by pressing with finger against the upper edge of the upper drum assembly at a point 180 degrees opposed to the contact point of pointer. If no movement is produced by this adjustment, slightly loosen two screws of the upper drum assembly. If the movement occurs too readily, tighten two screws slightly.
   (4) Make sure that the deviation of the eccentricity again to satisfies the specification.
6. Tighten two screws which hold the upper drum alternately and gradually (tightening torque : 78.5×10^{-2} N•m{8 kgf-cm}).
7. Make sure that the eccentricity of the upper drum to satisfiy the specification.
8. Remove the upper drum eccentricity gauges.

Note : Take care not to contact the pointer with the video heads.

9. Clean the video heads and tape running surface of the upper drum assembly with a cleaning piece moistened with cleaning fluld.
After cleaning, be sure to wipe the cleaned surface two to three times with a dry cloth.



Spec. : Pointer deviation is 3 μm or less.

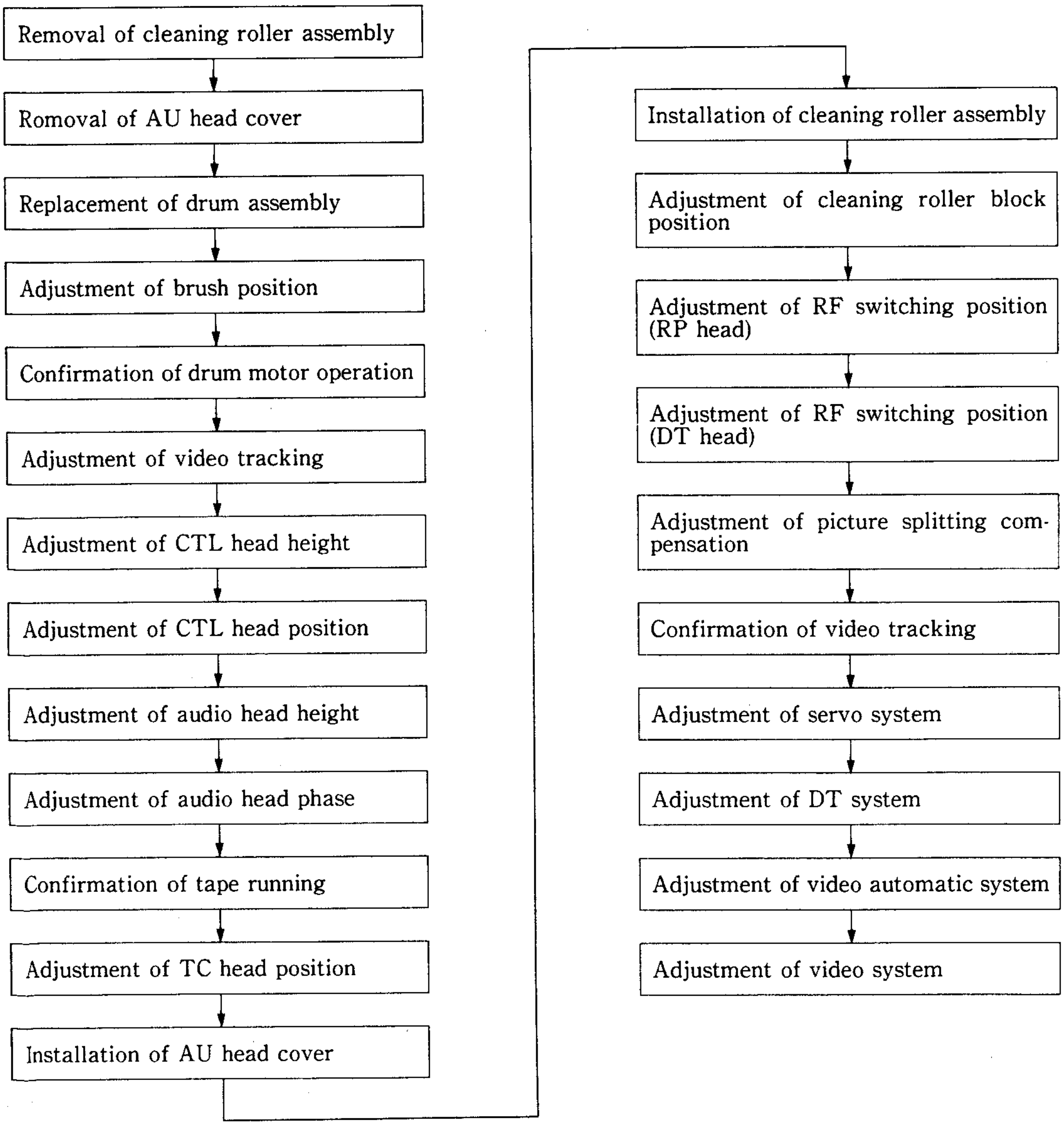
5-3. DRUM ASSEMBLY REPLACEMENT

- A drum assembly is a periodic replacement part. It is recommended to replace periodically based on the periodic maintenance table.
- It is necessary to replace the drum assembly in the following cases :
  (1) The lead surface of a lower drum is worn, and a correct RF waveform cannot be obtained even when tracking adjustment is performed.
  (2) The lower drum's lead surface and tape running surface of the lower drum are scratched and cannot be repaired.
  (3) The drum shaft bearings are out of life, resulting in noise or jitter that makes it impossible to maintain the performance of the unit.
- When replacing the drum assembly, replace an upper drum assembly at the same time.

Tools

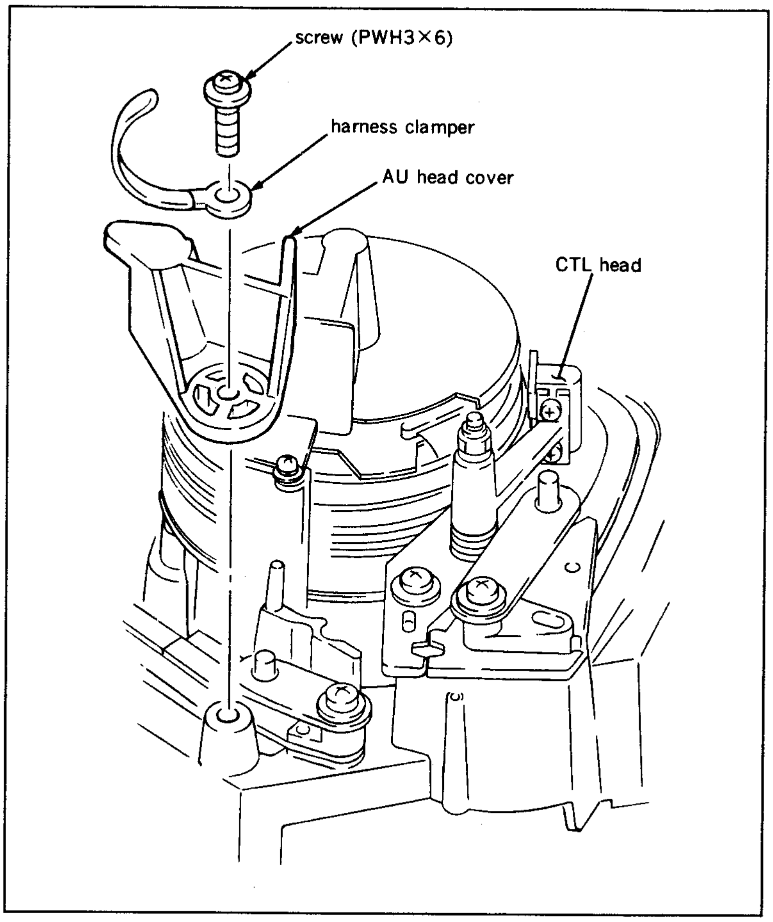
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart


Removal of cleaning roller assembly
Romoval of AU head cover
Replacement of drum assembly
Adjustment of brush position
Confirmation of drum motor operation
Adjustment of video tracking
Adjustment of CTL head height
Adjustment of CTL head position
Adjustment of audio head height
Adjustment of audio head phase
Confirmation of tape running
Adjustment of TC head position
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)
Adjustment of picture splitting compensation
Confirmation of video tracking
Adjustment of servo system
Adjustment of DT system
Adjustment of video automatic system
Adjustment of video system

Removal

1. Remove a cleaning roller assembly. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove a fly wheel of the upper part of a TG-4 tape guide roller. (Refer to step (1) in Section 5-2.)
3. Remove a screw (PWH3×6) as shown in the figure, and remove an AU head cover. At this time, the harness clamper of the drum comes off together.
4. Remove a brush block. (Refer to steps from (2) to (4) in Section 4-2.)

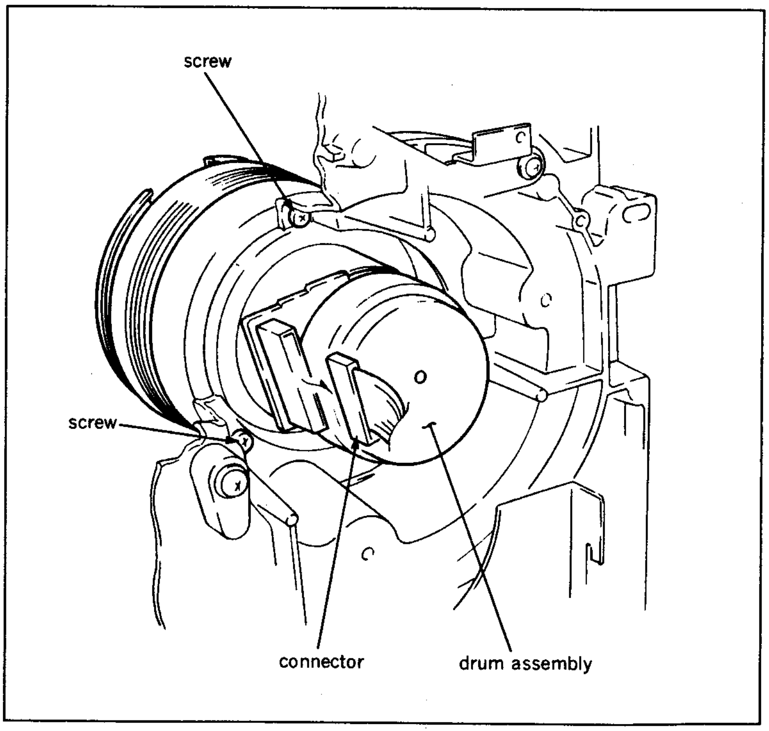


5. Open DR-118A board.
6. Disconnect connector connected to a drum assembly.
7. Hold the drum assembly from the unit surface by hand, and remove three screws from back side of the unit which are installing the drum assembly.

Note 1 : Hold the drum assembly with hands to prevent it from dropping.

Note 2 : Be careful not to damage the guides and other parts surrounding the drum assembly.

8. Slightly raise up the drum assembly, and disconnect two connectors CN1 and CN963 connected to the drum assembly.
9. Remove the drum assembly from the unit.



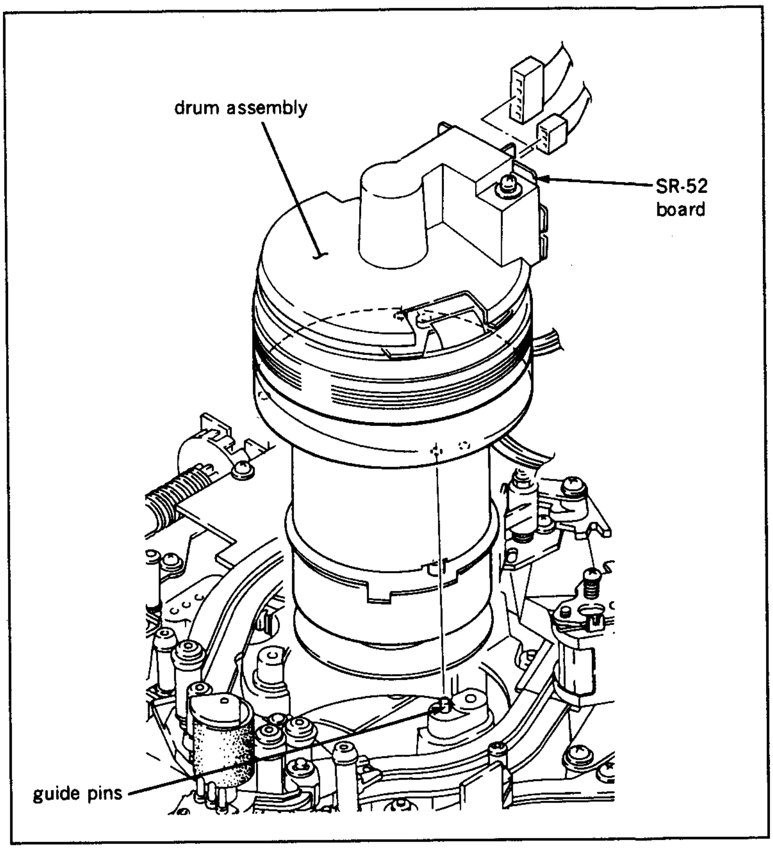
Installation

10. Clean the new drum assembly mounting surface and the chassis with cleaning piece moistened with cleaning fluid.
11. Connect the connectors CN1 and CN963 to a new drum assembly.
12. Install the drum assembly to the chassis while putting two guide pins of the chassis into the guide holes which are on the lower side of the new drum assembly.

Note 1: Pay particular attention not to cause damages to the tape running surface of the upper drum, video heads, lower drum's tape running surface and lead of the lower drum.

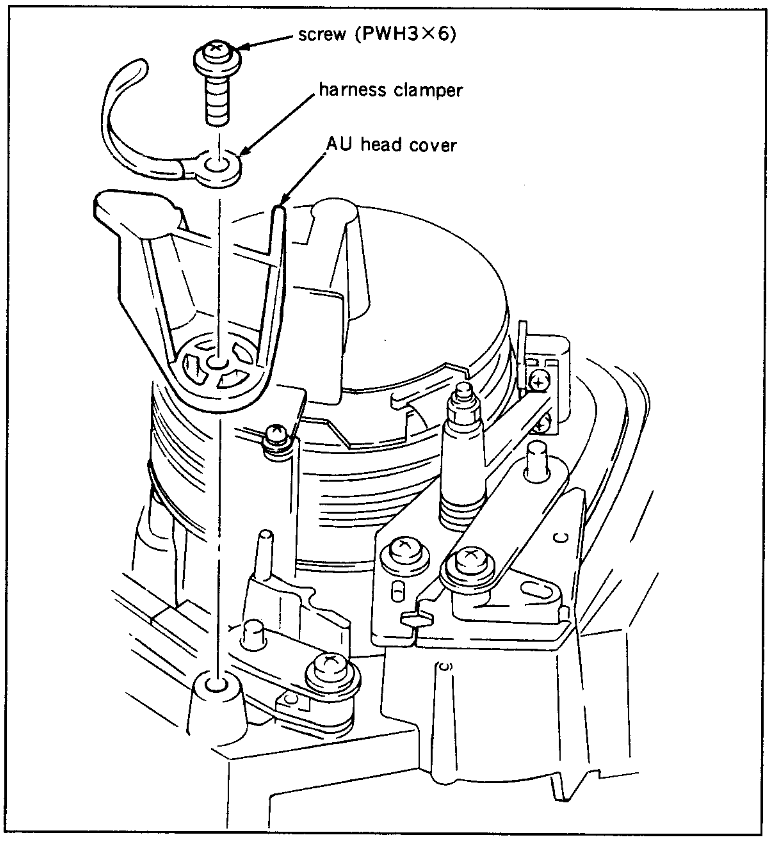
Note 2: Pay particular attention not to cause damages by contacting the guides and other parts surrounding the drum assembly.

13. Tighten the drum assembly with three screws.
14. Connect connector to drum assembly.
15. Clean the tape running surface of the drum assembly with a cleaning piece moistened with cleaning fluid. After cleaning, be sure to clean the cleaned surface two or three times with a soft dry cleaning piece.
16. Install the brush block to the studs with two screws snugly, but do not tighten.
17. Perform brush position adjustment. (Refer to Section 5-4-1.)
18. Install the brush cover.
19. Connect two connectors CN961 and CN962 to SR-52 board of the brush block.



Adjustments after replacement

20. Perform confirmation of drum motor operation. (Refer to Section 5-3-1.)
21. Perform video tracking adjustment. (Refer to Section 6-4.)
22. Perform CTL head height adjustment. (Refer to Section 6-5.)
23. Perform CTL head position adjustment. (Refer to Section 6-6.)
24. Perform audio head height adjustment. (Refer to Section 6-7.)
25. Perform audio head phase adjustment. (Refer to Section 6-8.)
26. Perform confirmation of tape running. (Refer to Section 6-3.)
27. Perform TC head position adjustment. (Refer to Section 6-10.)
28. Install the AU head cover together with the drum harness clamper.
29. Install the fly wheel to the upper part of the TG-4 tape guide roller. (Refer to step (27) in Section 5-2.)
30. Install the cleaning roller assembly. (Refer to steps (7) and (8) in Section 5-6.)
31. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
32. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
33. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)
34. Perform picture splitting compensation adjustment. (Refer to Section 6-15.)
35. Perform confirmation of video tracking. (Refer to Section 6-4.)
36. Perform servo system adjustment.
37. Perform DT system adjustment.
38. Perform video automatic adjustment.
39. Perform video system adjustment.



5-3-1. Drum Motor Operation Check

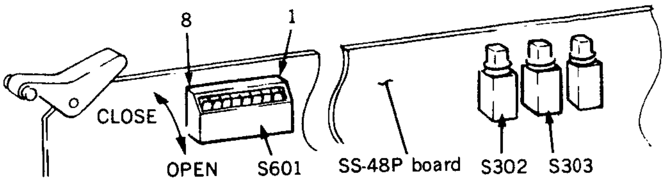
- Be sure to perform the drum motor operation check when a drum assembly is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

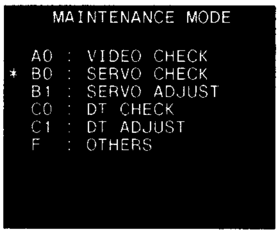
Check

1. Put Bit7 of S601 on SS-48P board in CLOSE state, and turn the POWER to ON.
2. Press S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "B0: SERVO CHECK" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO CHECK" mode.
5. Move * mark to "B02: MOTOR CHECK" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
7. Move * mark to "B026: DRUM MOTOR" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board and to execute "DRUM MOTOR" sub-menu.
9. Check the followings appears on the monitor screen :
   "SPEED : OK"
   "PHASE : LOCK"
   "PG : EXIST"
   If above messages are not displayed, check that four connectors connected with the drum assembly are inserted surely.
   If above messages are still not displayed, check the drum driver circuit, drum FG amplifier circuit and drum PG amplifier circuit (on DR-118A board).
10. Press S303 on SS-48P board, and check that the drum rotation stops.
11. Press S303 twice on SS-48P board to return to the mode screen.
12. Turn the POWER to OFF, and put Bit7 of S601 on SS-48P board in OPEN state.



S601-7/SS-48P : CLOSE

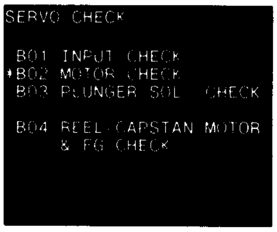
press S302



```
MAINTENANCE MODE

 A0 : VIDEO CHECK
* B0 : SERVO CHECK
 B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

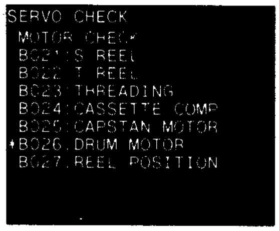
press S302



```
SERVO CHECK

 B01 INPUT CHECK
*B02 MOTOR CHECK
 B03 PLUNGER SOL  CHECK

 B04 REEL CAPSTAN MOTOR
     & FG CHECK
```

select with search dial

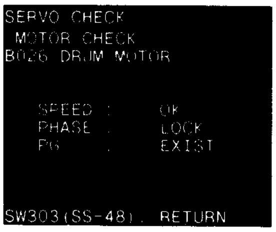
press S302



```
SERVO CHECK
 MOTOR CHECK
 B021:S REEL
 B022 T REEL
 B023:THREADING
 B024:CASSETTE COMP
 B025:CAPSTAN MOTOR
*B026.DRUM MOTOR
 B027.REEL POSITION
```

select with search dial

press S302



```
SERVO CHECK
 MOTOR CHECK
B026 DRUM MOTOR


   SPEED :      OK
   PHASE :      LOCK
   PG    :      EXIST


SW303(SS-48). RETURN
```

press S303

drum motor stops its rotation

press S303 twice

S601-7/SS-48P : OPEN

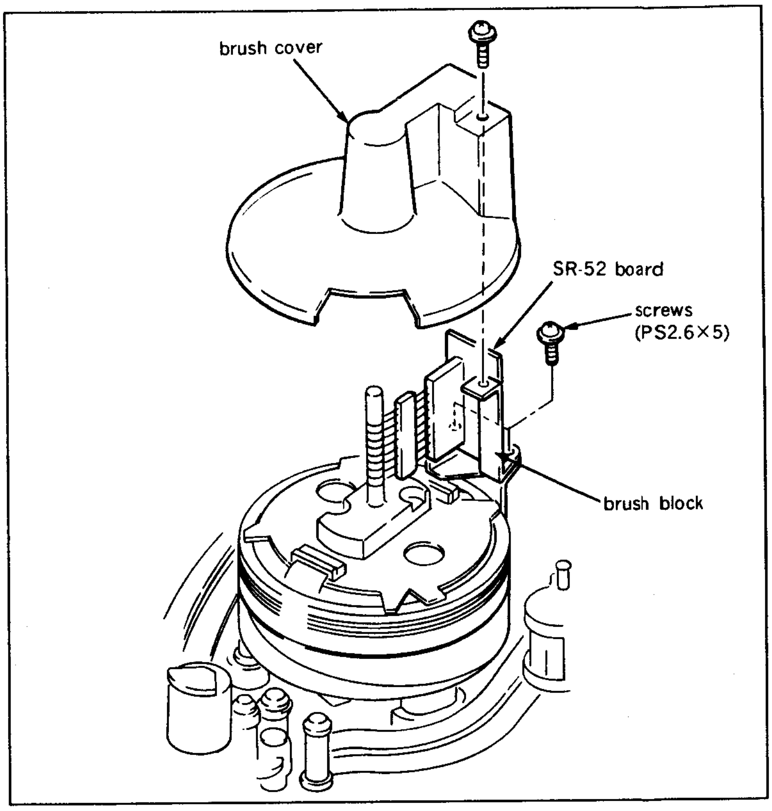
5-4. BRUSH BLOCK REPLACEMENT

Removal

1. Disconnect two connectors CN961 and CN962 on SR-52 board of a brush block.
2. Remove a fixing screw as shown in the figure, and remove a brush cover.
3. Remove two screws holding the brush block to the poles, and remove the brush block.

Installation

4. Install a new brush block with two screws (PS2.6×5) to the poles snugly, but do not tighten.
5. Perform brush position adjustment. (Refer to Section 5-4-1.)
6. Install the brush cover.
7. Connect connectors CN961 and CN962 to SR-52 board of brush block.



5-4-1. BRUSH POSITION ADJUSTMENT

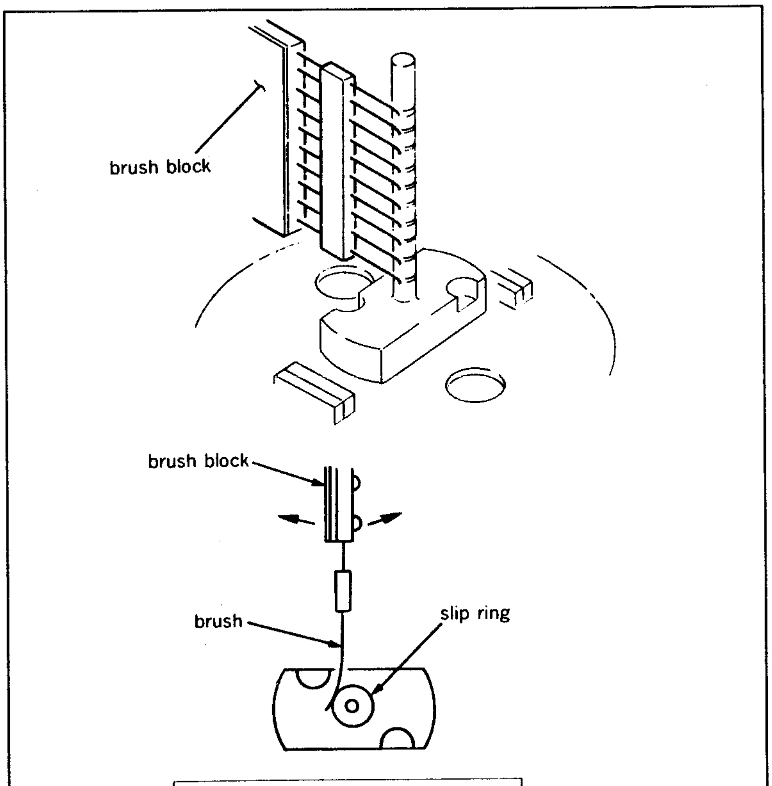
Adjustment

1. Remove a brush cover from the unit. (Refer to step (2) in Section 5-4.)
2. Loosen two screws holding a brush block 1/2 to 1 turn.
3. Move the brush block in the direction in the arrow to meet both specifications, and tighten two screws.

Spec. 1 : The brushes are positioned in the grooves of the slip ring.

Spec. 2 : The bend of the brush meets the required specification (shown in the figure.)

4. Install the brush cover.



Spec. : The root of the brush and the center of the slip ring is in line.

5-5. PINCH ROLLER ASSEMBLY REPLACEMENT

- The pinch roller assembly is a periodic replacement part. It is recommended to replaced periodically based on the periodic maintenance table.
- When a pinch roller assembly is worn or damaged, replace the pinch arm assembly.

Replacement flow chart

Replacement of pinch arm assembly

↓

Confirmation of tape running

↓

Confirmation of audio head height

↓

Confirmation of audio head phase

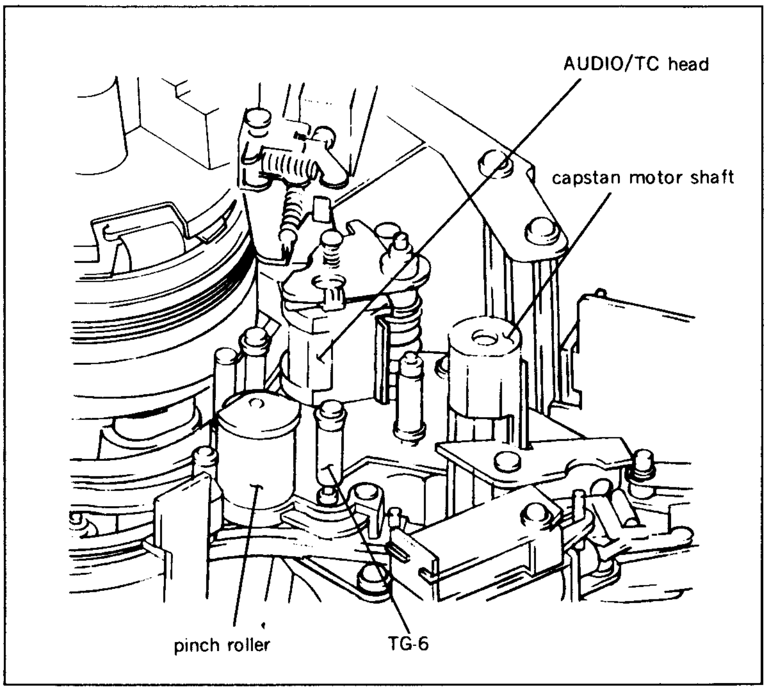
Tool

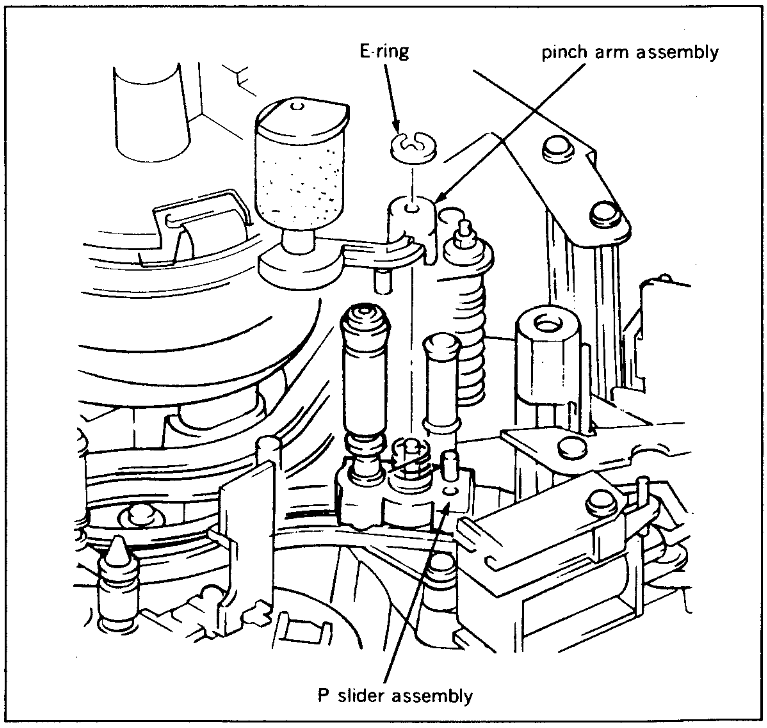
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Removal

1. Remove a cassette compartment.
2. Turn the POWER to ON.
3. Turn the POWER to OFF when a pinch roller comes to a position in front of a TG-6 tape guide.
4. Remove an E-ring on the upper part of a pinch arm assembly, and remove the pinch arm assembly from a P slider assembly.

Note : Do not remove a polyslider washer and spring at the bottom of the pinch arm assembly.


AUDIO/TC head
capstan motor shaft
pinch roller
TG-6


E-ring
pinch arm assembly
P slider assembly

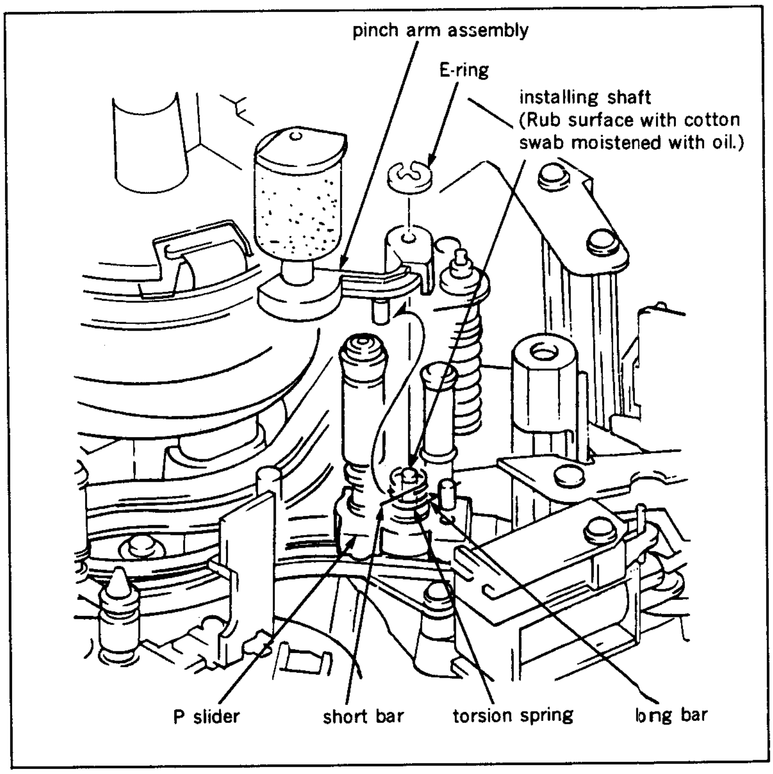
Installation

5. Rub surface of the installing shaft of the pinch arm assembly with cotton swab moistened with oil, in other words, apply about a half of drop oil to the shaft.
6. Set a spring as shown in the figure, and install a new pinch arm assembly and fasten it to the P slider assembly with E-ring.

Note 1: Install a spring so that the long bar is to the shaft on the P slider assembly, and the short bar is to the pinch arm assembly.

Note 2: Using tweezers to install the spring will help to easy installation.

7. Push the pinch arm assembly toward the TG-6 tape guide with finger, then release the finger and make sure that it returns smoothly to its original position.
   Clean the new pinch roller with a cleaning piece moistened with cleaning fluid.


pinch arm assembly
E-ring
installing shaft
(Rub surface with cotton swab moistened with oil.)
P slider
short bar
torsion spring
long bar

Adjustment after replacement

8. Perform confirmation of tape running. (Refer to Section 6-3.)
9. Perform confirmation of video tracking. (Refer to Section 6-4.)
10. Perform confirmation of audio head height. (Refer to Section 6-7.)
11. Perform confirmation of audio head phase. (Refer to Section 6-8.)

5-6. CLEANING ROLLER ASSEMBLY REPLACEMENT

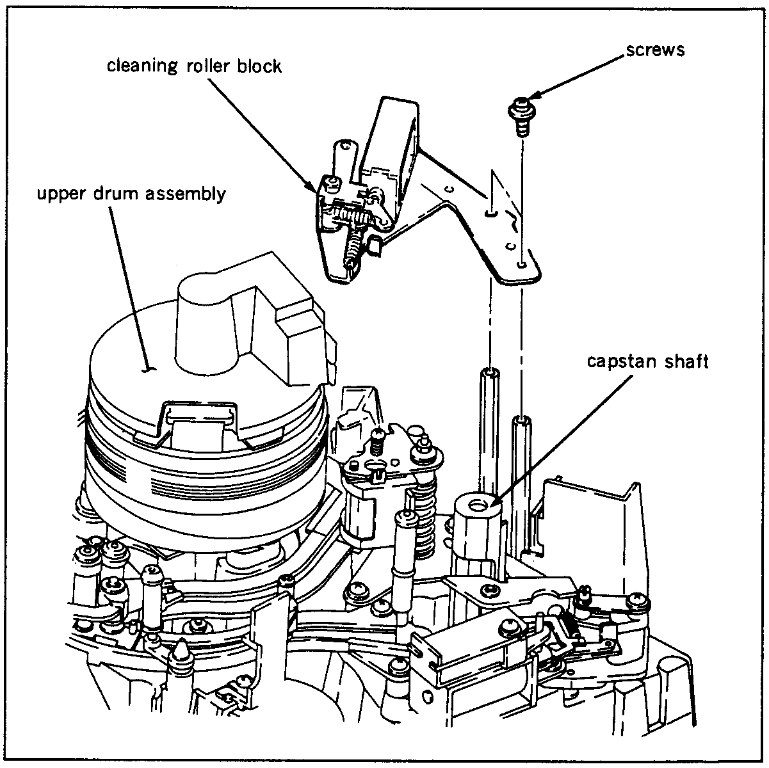
- The the cleaning roller assembly is a periodic replacement part. It is recommended to replaced periodically based on the periodic maintenance table.

Replacement flow chart

Replacement of cleaning roller assembly

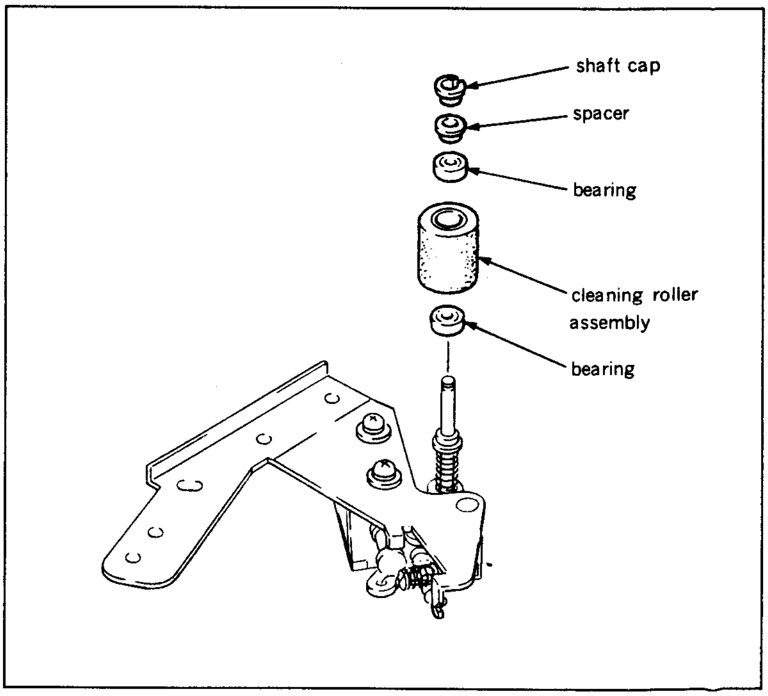
↓

Adjustment of cleaning roller block position



Removal

1. Disconnect a connector of a cleaning solenoid from CN916 on PD-56 board which is positioned on a pinch solenoid block.
2. Remove two screws holding a cleaning roller block, and remove it.
3. Remove a shaft cap of a cleaning roller, and remove a cleaning roller assembly.



Installation

4. Install bearings to the both side of a new cleaning roller assembly, and insert the assembled cleaning roller assembly and a spacer to the shaft in the order as shown in the figure.
5. Install the shaft cap to the top of the shaft.
6. Make sure that the cleaning roller rotates smoothly when rotating the cleaning roller with hand.
7. Install the cleaning roller block to the shafts with two screws snugly, but do not tighten.
8. Connect connector CN916 of the cleaning solenoid on PD-56 board.

Adjustment after replacement

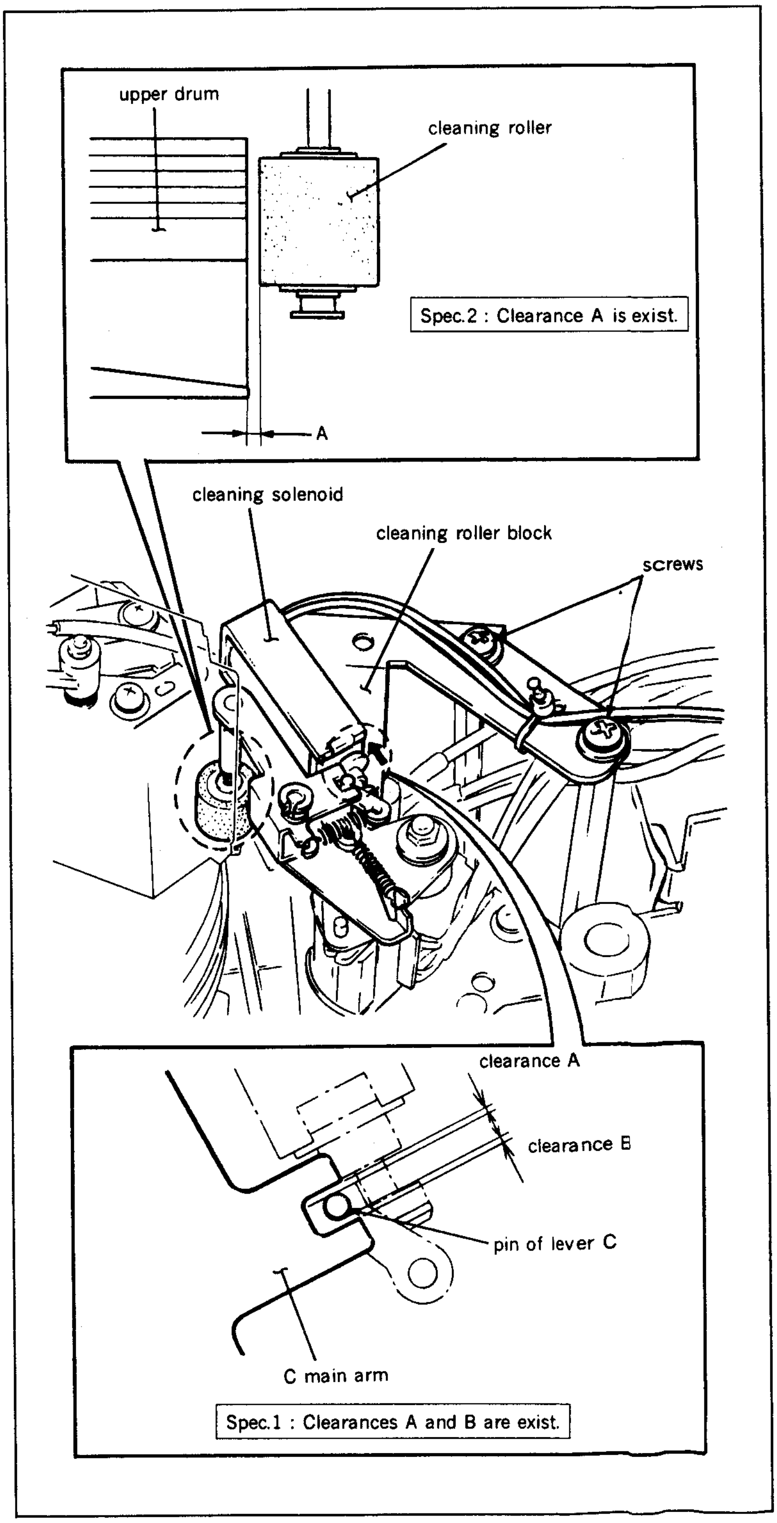
9. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

5-6-1. Cleaning Roller Block Position Adjustment

- Be sure to perform a cleaning roller block position adjustment, when the cleaning roller block is removed.

Adjustment

1. Install a cleaning roller block to the shafts with two screws snugly, but do not tighten.
2. While pushing an iron core of a cleaning roller solenoid in the direction of arrow (energized position), adjust the position of the cleaning roller block so that the clearances between a pin of a lever C and C main arm satisfy the specification 1. Then tighten it with two screws.
3. Visually check the clearance between a drum and cleaning roller satisfy the specification 2.
4. Turn the POWER to ON, then the unit put into threading mode automatically.
   While the cleaning solenoid is energized in threading mode, visually check that the clearances between the pin of the lever C and C main arm satisfy the specification 1.
   If the specification is not satisfied, readjust the cleaning roller block position so that the specification 1 is satisfied.


upper drum
cleaning roller
Spec.2 : Clearance A is exist.
A
cleaning solenoid
cleaning roller block
screws
clearance A
clearance B
pin of lever C
C main arm
Spec.1 : Clearances A and B are exist.

5-7. BRAKE LINING ASSEMBLY REPLACEMENT

- When the POWER is OFF, T reel brake lining and S reel brake lining are pressed against the take-up reel table and supply reel table.
  When the POWER is turned ON, the S and T reel brake linings are released.
  The reel brake linings still released even at PLAY, STOP, REW, F.FWD, SEARCH and REV modes.
  Press the EJECT button to put into the EJECT mode. Few seconds later after the EJECT mode is completed, the S and T reel brake linigs are pressed against the reel tables.

Replacement flow chart

Removal of reel table
↓
Replacement of brake lining assembly
↓
Installation of reel table
↓
Confirmation of reel brake clearance
↓
Confirmation of reel brake release amount
↓
Confirmation of reel table height

If the reel brake release amount does not satisfy the specification, and then reel brake release amount adjustment is performed, be sure to perform the following adjustments:

Adjustment of cassette pillar (S) height
↓
Adjustment of reel table height

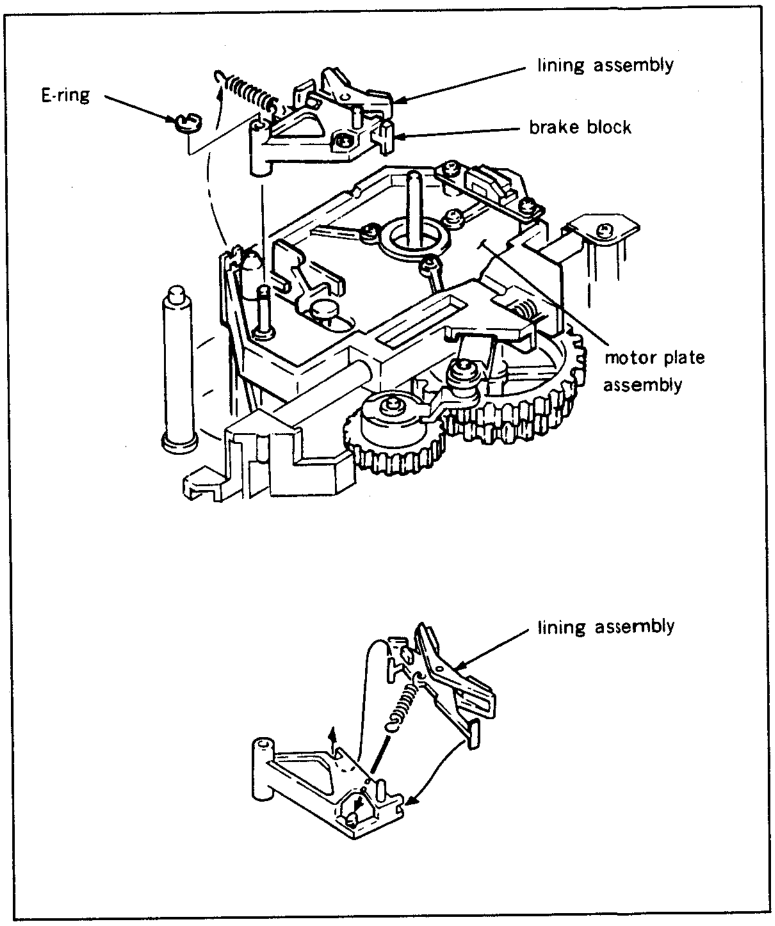
Removal and installation

1. Remove a reel table. (Refer to steps from (1) to (6) in Section 5-10.)
2. Unhook a spring of a brake block as shown in the figure from a motor plate assembly.
3. Remove an E-ring that holds the brake block, and remove it.
4. Unhook a spring in the brake block as shown in the figure and remove a lining assembly.
5. Assemble a new lining assembly in the reversing the order of steps (2) to (4).
6. Install the reel table to the reel shaft.

Note : Two fixing screws must be fasten after the reel table height check is completed.

Adjustment after replacement

7. Perform confirmation of reel brake clearance. (Refer to Section 5-7-1.)
8. Perform confirmation of brake release amount. (Refer to steps from (1) to (3) in Section 5-7-2.)
9. Perform confirmation of reel table height. (Refer to stps from (1) to (8) in Section 5-10-2.)

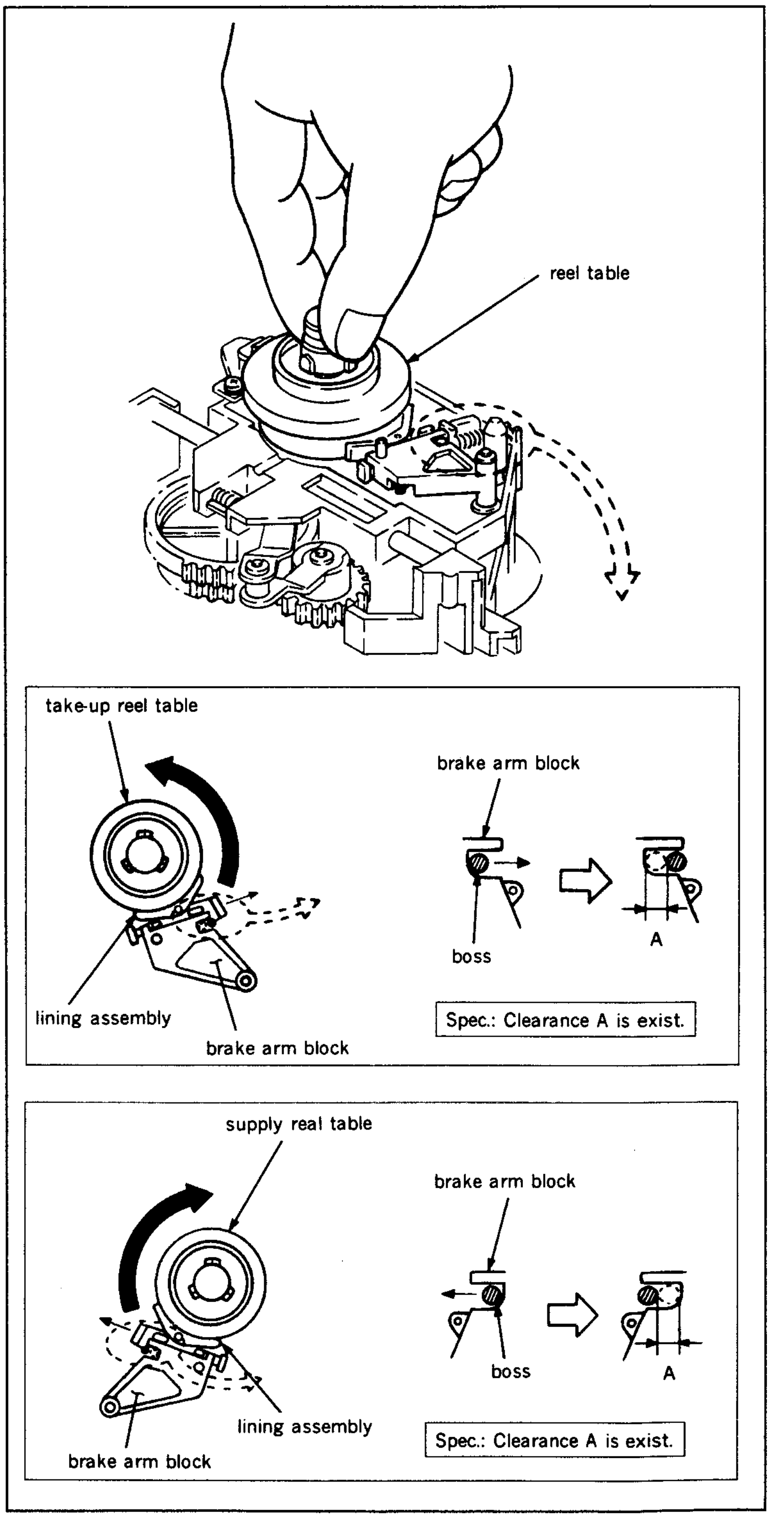


5-7-1. Reel Brake Clearance Check

- Be sure to perform a reel brake clearance check, when the brake lining assembly is removed.

Check

1. Make sure that there is a clearance between a brake arm block and boss when a take-up reel table is turned counterclockwise direction by fingers.
   If there is no clearance, replace the lining assembly.
2. Make sure that there is a clearance between a brake arm block and boss when a supply reel table is turned clockwise direction by fingers.
   If there is no clearance, replace the lining assembly.


reel table
take-up reel table
brake arm block
boss
A
lining assembly
brake arm block
supply real table
brake arm block
boss
A
lining assembly
brake arm block

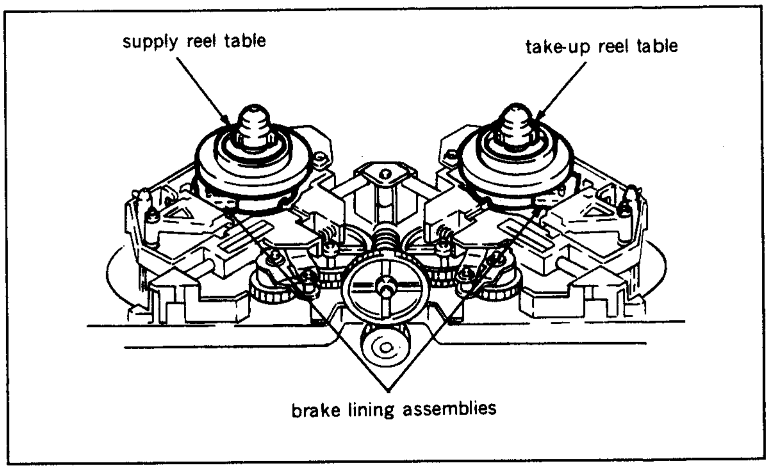
Spec.: Clearance A is exist.

Spec.: Clearance A is exist.

5-7-2. Reel Brake Release Amount Adjustment

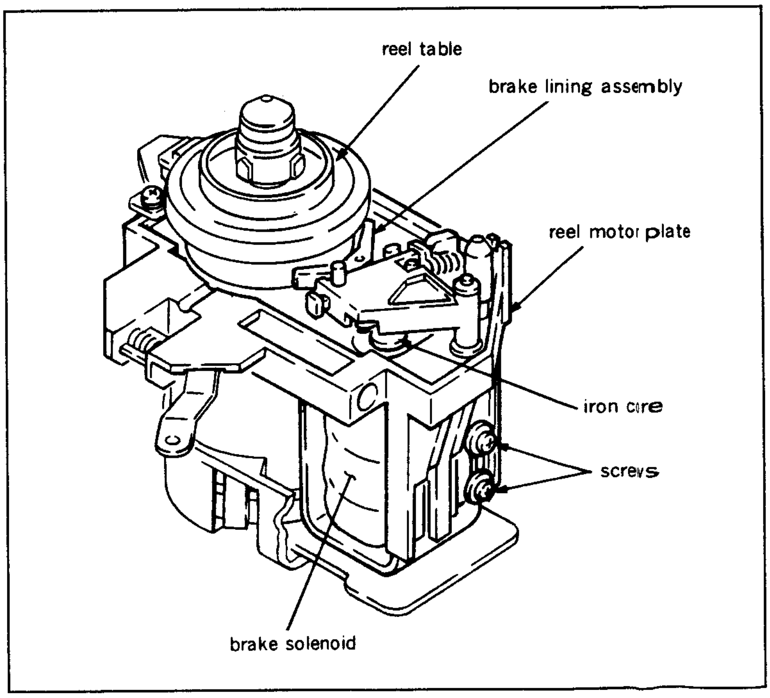
- Be sure to perform a reel brake release amount check, when the brake lining assembly is replaced.
- Be sure to perform a reel brake release amount adjustment, after the brake solenoid is replaced or removed.

Check



1. Turn the POWER to ON.
2. Make sure that a T brake lining assembly doesn't touch a take-up reel table while the take-up reel table is rotating. (Specification 1) (For reference : clearance is 0.6 to 1.8 mm.) If the specification is not satisfied, perform the adjustment step (4) and later.
2. Make sure that a S brake lining assembly doesn't touch a supply reel table while the supply reel table is rotating. (Specification 2) (For reference : clearance is 0.6 to 1.8 mm.) If the specification is not satisfied, perform the adjustment step (4) and later.

Adjustment



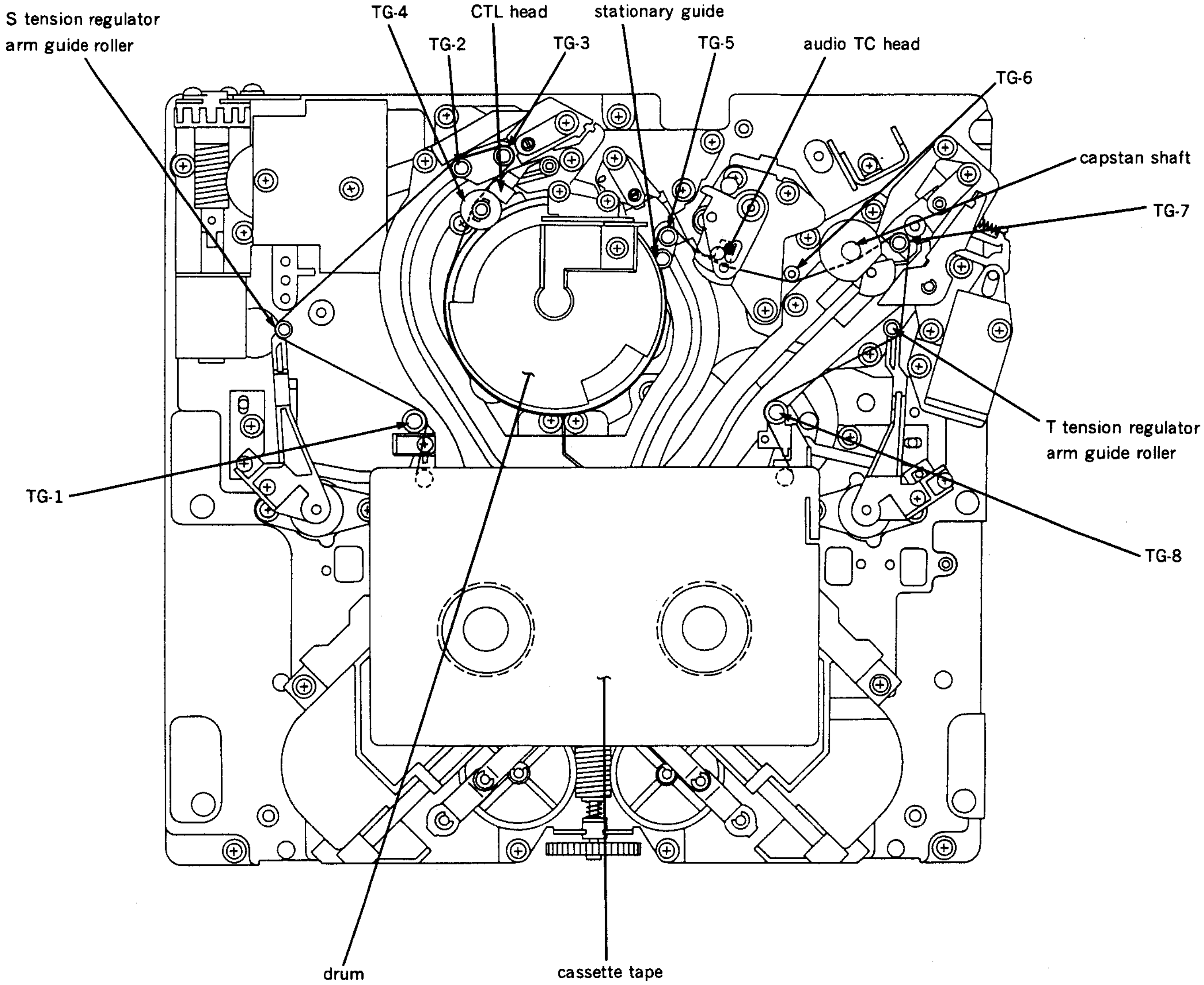
4. Turn the POWER to OFF.
5. Remove a reel motor plate. (Refer to steps from (1) to (6) in Section 5-11.)
6. Loosen two screws which hold a brake solenoid ½ to 1 turn..
7. Adjust the brake solenoid position by pushing down an iron core of the brake solenoid to energized position so that there is a clearance between the reel table and brake liningassembly.

Specification : There is a clearance (0.6 to 1.8 mm) between the reel table and brake linig assembly when the solenoid is energized position.

8. Tighten two fixing screws of the brake solenoid.
9. Reconfirm that there is a clearance between the reel table and brake lining assembly when pushing down the iron core of the break solenoid to energized position.
10. Assemble the reel motor plate in the reversing the order of steps (1) to (6) in Section 5-11.
11. Perform the following adjustment afteradjustment :
    Perform cassette pillar (S) height check. (Refer to steps from (1) to (6) in Section 5-10-1.)
    Perform reel table height check. (Refer to steps from (1) to (8) in Section 5-10-2.)

5-8. TAPE GUIDE REPLACEMENT

- This section describes the replacement procedure for the tape guide roller.
  All the replacement procedures for the tape guide rollers are the same except TG-4 tape guide roller.
- Pay particular attention not to cause damage to the tape guide roller as the tape guide roller touches the tape.


S tension regulator arm guide roller
TG-4
CTL head
stationary guide
TG-2
TG-3
TG-5
audio TC head
TG-6
capstan shaft
TG-7
T tension regulator arm guide roller
TG-8
TG-1
drum
cassette tape

⟨This figure shows that the unit is in the threading and state.⟩

5-8-1. TG-4 Tape Guide Roller Replacement

Tools

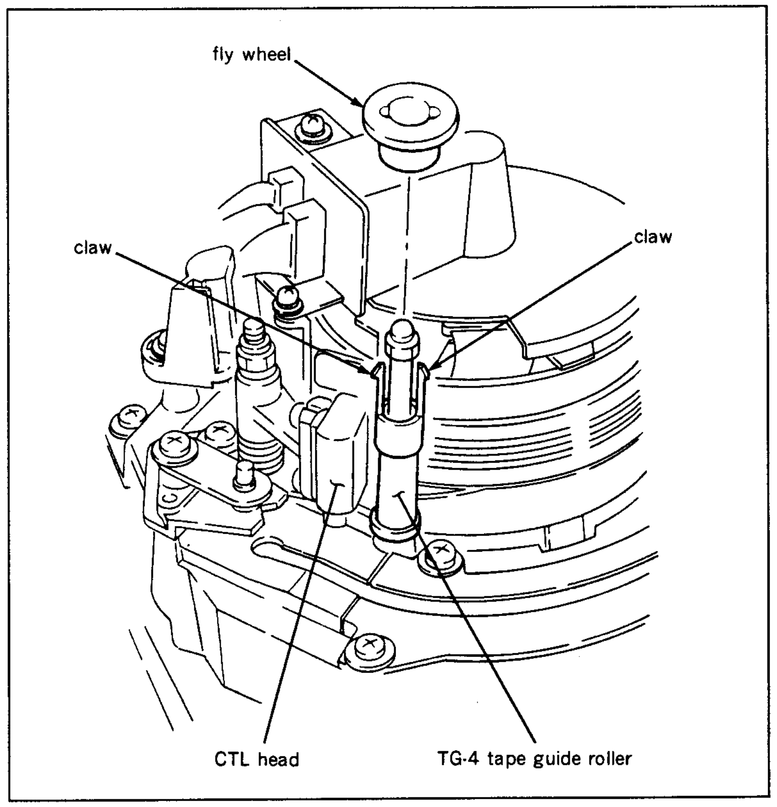
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

Replacement of TG-4 tape guide roller
↓
Adjustment of Tape running
↓
Adjustment of video tracking
↓
Adjustment of CTL head height
↓
Adjustment of CTL head position
↓
Adjustment of TC head position
↓
Adjustment of RF switching position (RP head)
↓
Adjustment of RF switching position (DT head)

Removal

1. Rotate an upper drum assembly by hand, and set the video heads away from a TG-4 tape guide roller.
2. Hold claws of the upper part of the TG-4 tape guide roller using tweezers, and remove a fly wheel.



3. Unscrew a nut on the upper part of the TG-4 tape guide roller, and remove a bearing holder and TG-4 tape guide roller.

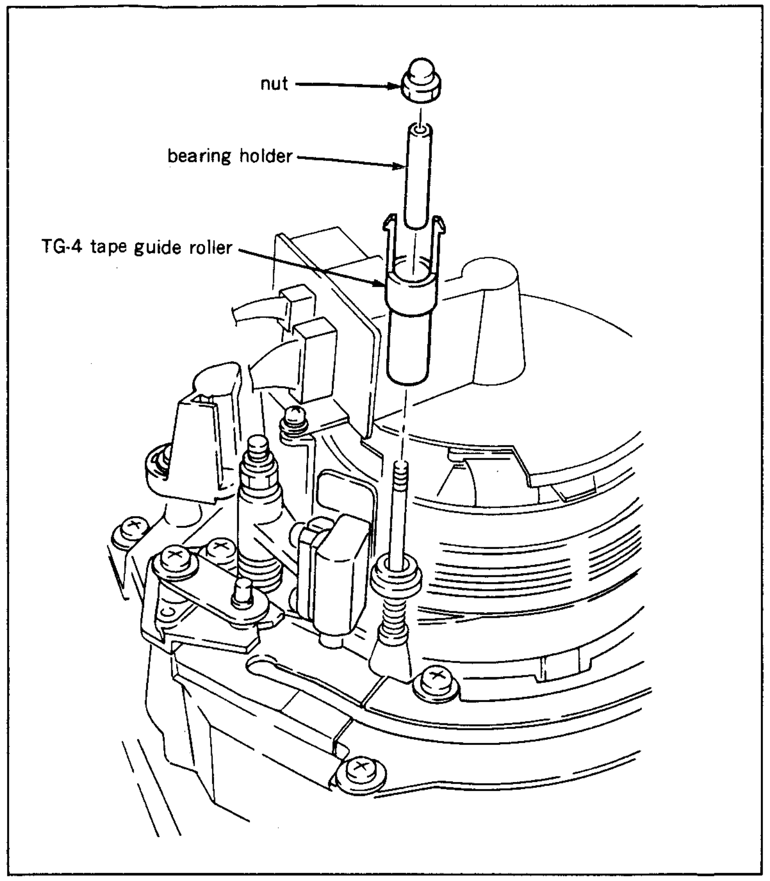
Note :Pay particular attention not to cause damage to the upper drum assembly during removal.

Installation

4. Install a new TG-4 tape guide roller and bearing holder, and then tighten the nut.
5. Make sure that the TG-4 tape guide roller rotates smoothly when rotating it by hand.
6. Clean the TG-4 tape guide roller with a cleaning piece moistened with cleaning fluid.
7. Align two claws of the upper part of the TG-4 tape guide roller and the two grooves of the fly wheel, then install the fly wheel to the TG-4 tape guide roller.
   Make sure that the fly wheel is surely locked, after the installation.

Adjustment after replacement

8. Perform tape running adjustment. (Refer to Section 6-3.)
9. Perform video tracking adjustment. (Refer to Section 6-4.)
10. Perform CTL head height adjustment. (Refer to Section 6-5.)
11. Perform CTL head position adjustment. (Refer to Section 6-6.)
12. Perform TC head position adjustment. (Refer to Section 6-10.)
13. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
14. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)

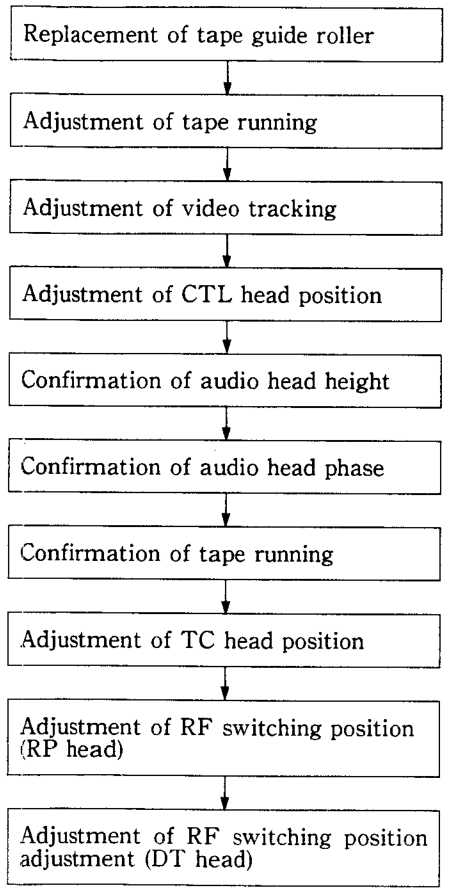


5-8-2. Other Tape Guide Rollers Replacement

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Tape guide adjustment driver	: J-6321-500-A

Replacement flow chart


Replacement of tape guide roller
Adjustment of tape running
Adjustment of video tracking
Adjustment of CTL head position
Confirmation of audio head height
Confirmation of audio head phase
Confirmation of tape running
Adjustment of TC head position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position adjustment (DT head)

Removal

1. Make sure that the unit is in unthreading end mode.
2. Loosen locking screw of the upper part of the tape guide roller for one to two turns with a tape guide adjustment driver.

Note :Pay particular attention not to cause damage to other tape guide rollers.

3. Rotate an upper flange of the tape guide, and remove it from a tape guide shaft.
4. Remove a tape guide roller.

Installation

5. Install a new tape guide roller and upper flange.

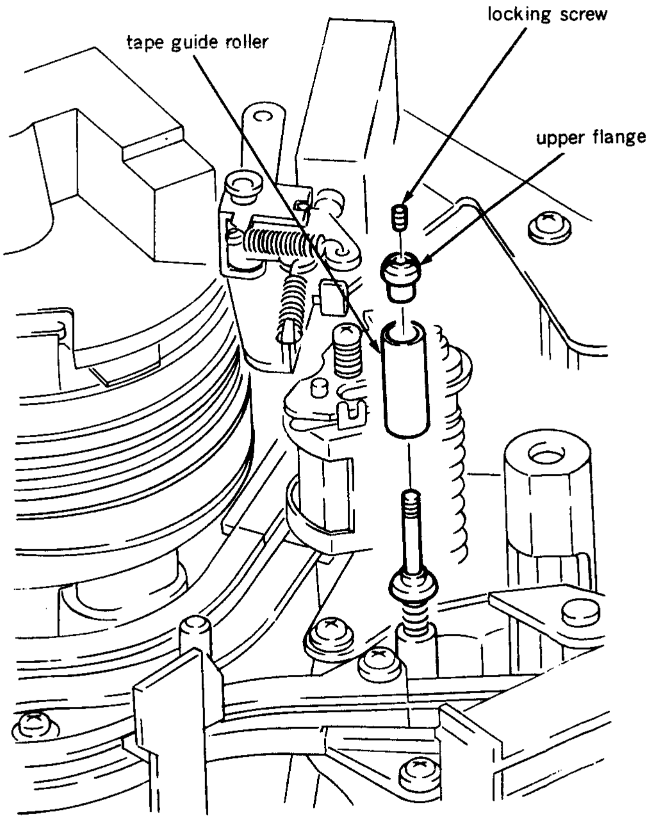
Note :Pay particular attention not to cause damage to other tape guide rollers during installation.

6. Tighten tentatively the locking screw of the upper part of the tape guide with the tape guide adjustment driver.
7. Make sure that the tape guide roller rotates smoothly when rotating the tape guide roller with hand.
8. Clean the tape guide roller, upper flange and lower flange with a cleaning piece moistened with cleaning fluid.

Adjustment after replacement

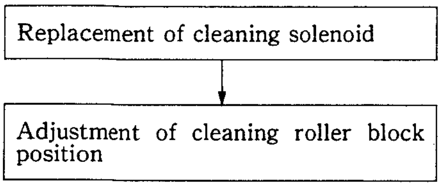
9. Perform tape running adjustment. (Refer to Section 6-3.)
10. Perform video tracking adjustment. (Refer to Section 6-4.)
11. Perform CTL head position adjustment. (Refer to Section 6-6.)
12. Perform confirmation of audio head height. (Refer to Section 6-7.)
13. Perform confirmation of audio head phase. (Refer to Section 6-8.)
14. Perform confirmation of tape running. (Refer to Section 6-3.)
15. Perform TC head position adjustment. (Refer to Section 6-10.)
16. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
17. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)

<Illustration shows TG-6 tape guide>



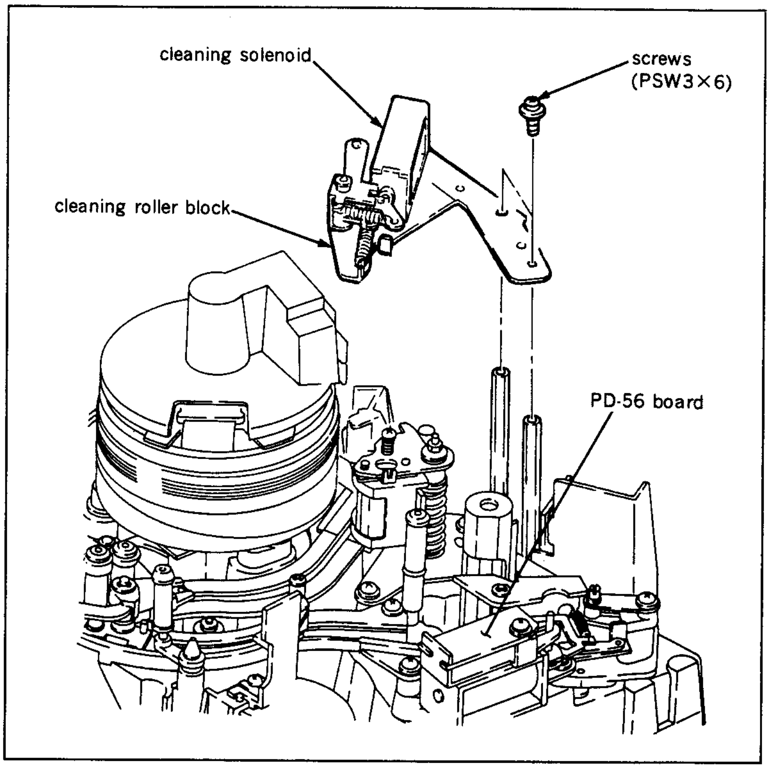
5-9. CLEANING SOLENOID REPLACEMENT

Replacement flow chart


Replacement of cleaning solenoid
Adjustment of cleaning roller block position

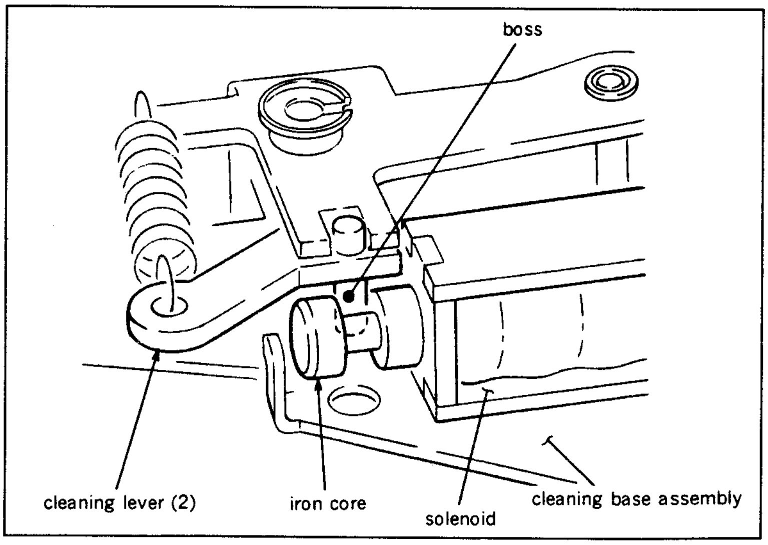
Removal

1. Disconnect connector of a cleaning solenoid from CN916 on PD-56 board which is positioned on a pinch solenoid block.
2. Remove two screws (PSW3×6) holding a cleaning roller block, and remove the cleaning roller block.
3. Remove two screws (PS2.6×4) and washers holding the cleaning solenoid, and remove the cleaning solenoid.


cleaning solenoid
screws (PSW3×6)
cleaning roller block
PD-56 board

Installation

4. Install a new solenoid to a cleaning base assembly with two washers and screws (PS2.6×4) while inserting a boss of a cleaning lever (2) into the groove of an iron core of the solenoid.


boss
cleaning lever (2)
iron core
solenoid
cleaning base assembly

5. Tighen the cleaning roller block to the studs with two screws (PSW3×8), but do not tighten.
6. Connect the connector CN916 of the cleaning solenoid to PD-56 board.

Adjustment after replacement

7. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

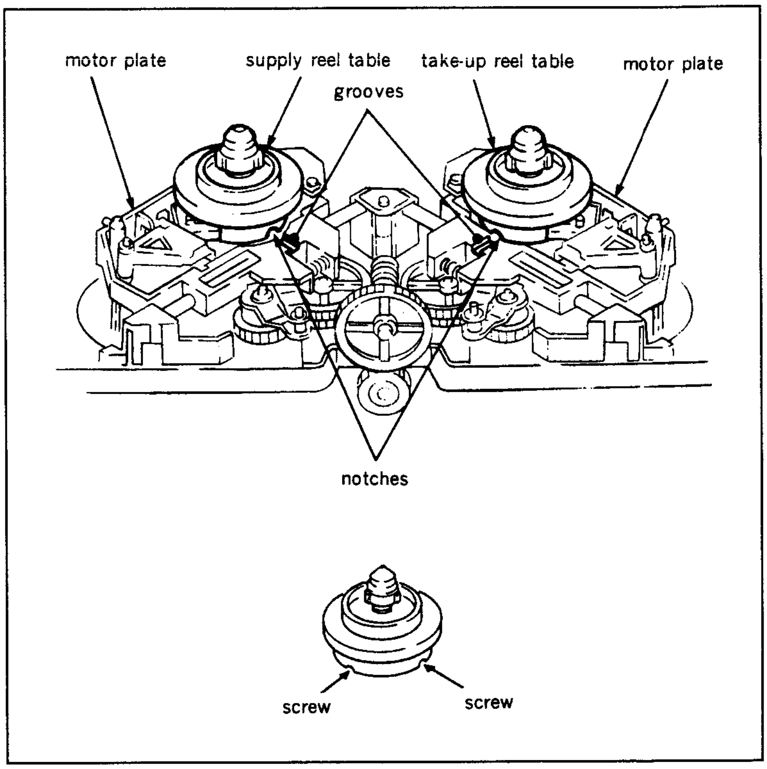
5-10. REEL TABLE REPLACEMENT

Tools

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
L shaped wrench (across flat has 1.5 mm)
: 7-700-736-05

Replacement flow chart

Replecement of reel table
↓
Confirmation of cassette pillar (S) height
↓
Adjustment of reel table height
↓
Confirmation of reel rotation detector position
↓
Adjustment of reel FG duty



Removal

1. Align one of the notch at the lower part of a reel table to a groove of a motor plate by rotating the reel table by hand.
2. Insert the L shaped wrench along with the groove of the motor plate, and put it into the screw hole at the lower part of the reel table.
3. Loosen a fixing screw of the reel table for two to three turns.
4. Rotate the reel table more, and align the other notch at the lower part of the reel table to the groove of the motor plate.
5. Repeat the above steps (2) and (3) in order to loosen the fixing screw of the reel table.
6. Remove the reel table from the motor plate assembly.

Note :A polyslider washer for reel table height adjustment is inserted at the lower part of the bearing of the reel table.
Pay particular attention not to lose the polyslider washer when removing the reel table as the polyslider washer may be stuck with the lower part of the reel table.

Installation

7. Clean a new reel table with a cleaning piece moistened with cleaning fluid, and install it to a reel motor shaft.

Note :Tighten two fixing screws after the reel table height check is performed.

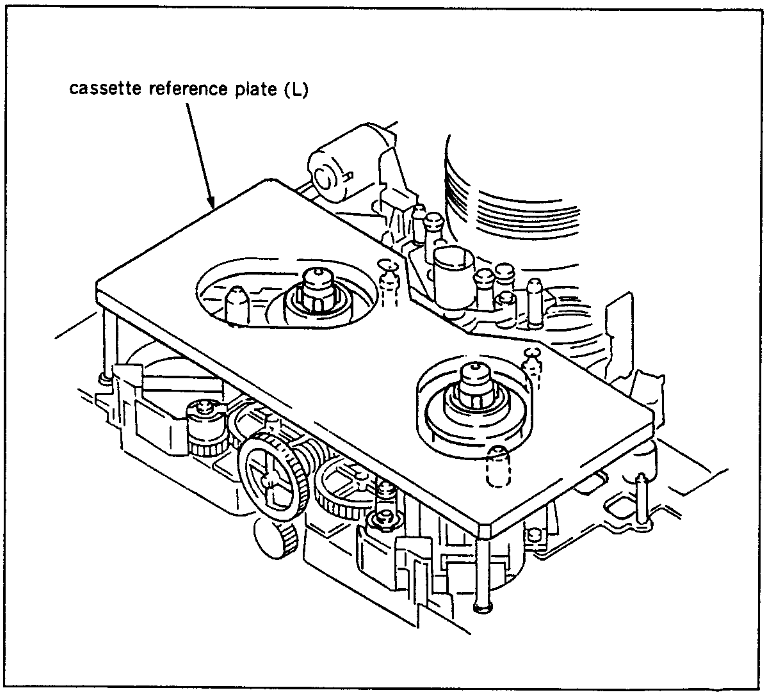
Adjustment after replacement

8. Perform confirmation of cassette pillar (S) height. (Refer to steps from (1) to (6) in Section 5-10-1.)
9. Perform reel table height adjustment. (Refer to Section 5-10-2.)
10. Perform reel rotation detector position adjustment. (Refer to steps from (1) to (5) in Section 5-10-3.)
11. Perform reel FG duty adjustment. (Refer to Section 5-12-3.)

5-10-1. Cassette Pillar (S) Height Adjustment

Tools

Cassette reference plate (L) : J-6320-880-A
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Adjustment mirror : J-6080-029-A
L shaped wrench (across flat has 1.5 mm) : 7-700-736-05



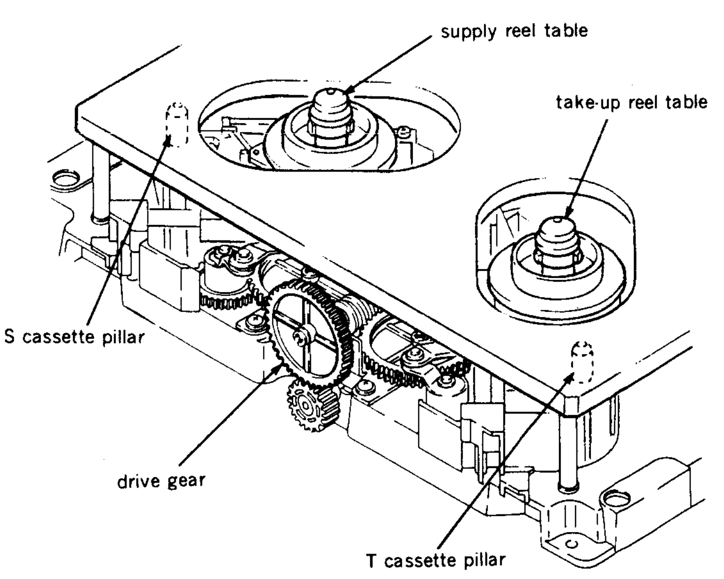
Check

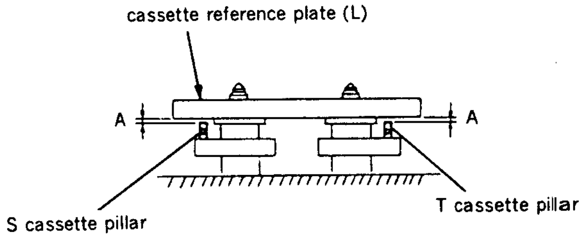
1. Make sure that the unit is in unthreading end mode.
2. Clean surface of the cassette reference plate (L) with a cleaning piece moistened with cleaning fluid.
3. Place the cassette reference plate (L) on four cassette pillars.

4. Place the supply and take-up reel tables to the intermediate position between S cassette position and L cassette position by rotating a drive gear by fingers as shown in the figure. Make sure that the S cassette pillar and T cassette pillar are positioned under the cassette reference plate (L) as shown in the figure. (The S cassette pillar and T cassette pillar should not be seen from the upper part of the unit.)
5. Turn over the cassette reference plate (L) and place it on four cassette pillars.
6. Check with adjustment mirror that there are no clearances between the cassette reference plate (L) and S cassette pillar, and T cassette pillar.
   If the specifications are not satisfied, perform the following adjustment.

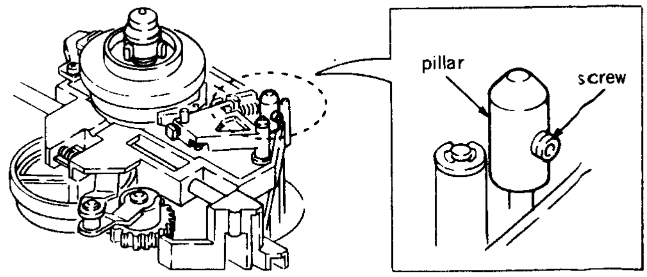
Adjustment

7. Loosen a fixing screw of the S cassette pillar and/or T cassette pillar 1/2 to one turn with the L shaped wrench.
8. Lift the S cassette pillar and/or T cassette pillar, and contact it with the cassette reference plate (L).
   Tighten a fixing screw with L shaped wrench under this condition.
9. Make sure that the specification is satisfied.


supply reel table
take-up reel table
S cassette pillar
drive gear
T cassette pillar


cassette reference plate (L)
A
A
S cassette pillar
T cassette pillar

Spec.: Clearance A is not exist.


pillar
screw

5-10-2. Reel Table Height Adjustment

- This adjustment is not necessary in general, however, perform when a reel motor is replaced or a reel table is removed or replaced.
- Pay particular attention to perform this adjustment as it is to be the reference for the tape running system.

Tools

Cassette reference plate (L): J-6320-880-A
Reel table height gauge : J-6320-680-A
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
L shaped wrench (across flat has 1.5 mm)
: 7-700-736-05

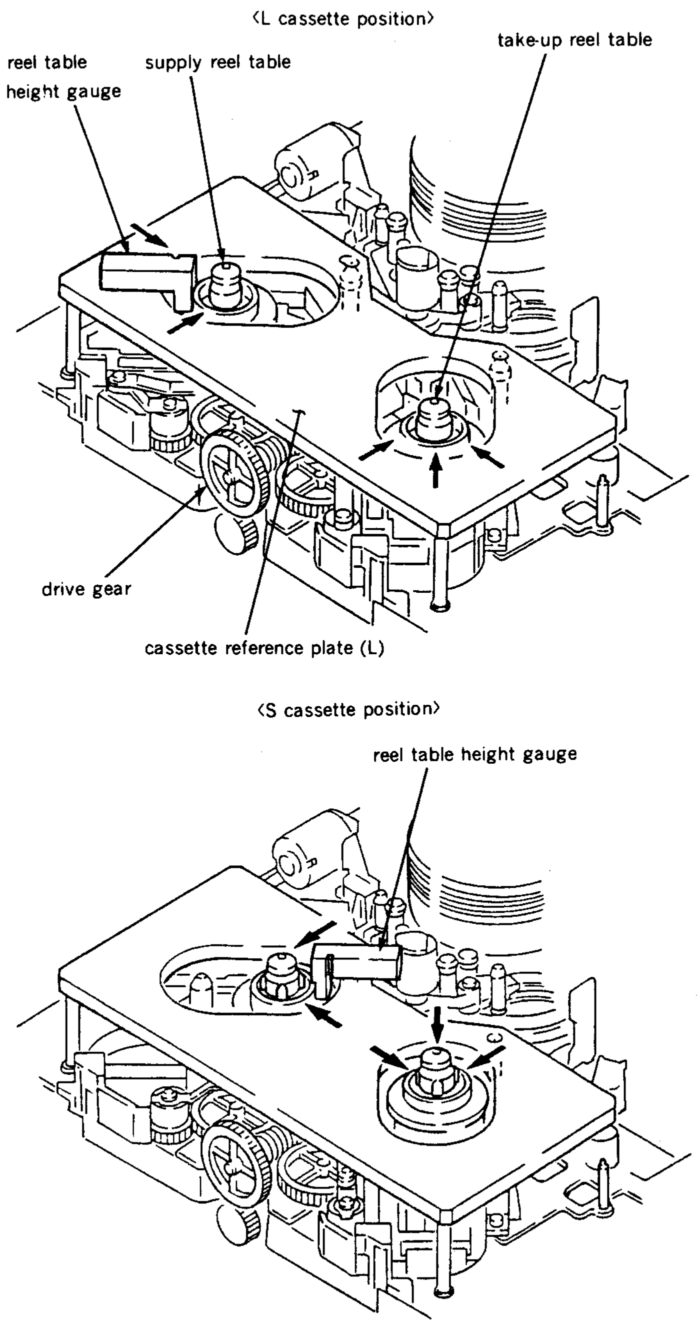
Check

1. Make sure that the unit is in unthreading end mode.
2. Rotate a drive gear by fingers so that a reel table is placed to the L cassette position.
3. Clean the surface of the cassette reference plate (L) with a cleaning piece moistened with cleaning fluid.
4. Place the cassette reference plate (L) on four cassette pillars.
5. Clean the surface of the reel table height gauge with a cleaning piece moistened with cleaning fluid.
6. Move the reel table heigh gauge from three directions of arrows towards supply reel table or take-up reel table, and make sure that the specificaions are satisfied.

Specification 1 : * marked portion (passing side) as shown in the figure of the gauge runs over the flange of the reel table.

Specification 2 : * * marked portion (no passing side) as shown in the figure of the gauge is blocked at the flange of the reel table.

7. Rotate the drive gear by fingers so that the reel table is placed to the S cassette position.
8. Perform step (6) and make sure that the specifications are satisfied.
If any specification is not satisfied, perform step (9) and later, and repeat the adjustment at both L cassette position and S cassette position until the specifications are satisfied.
If the specification is satisied, at both positions, perform step (11) and later.


<L cassette position>

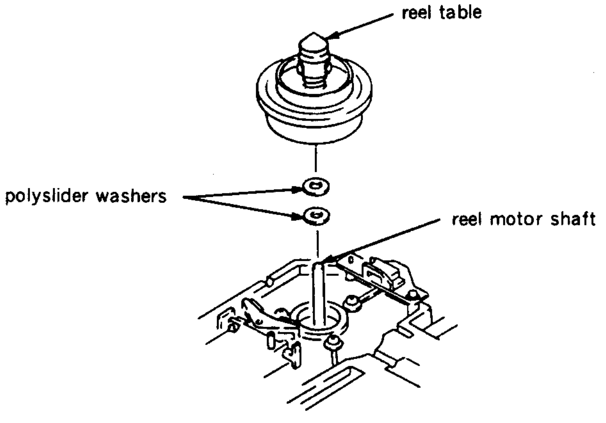
<S cassette position>

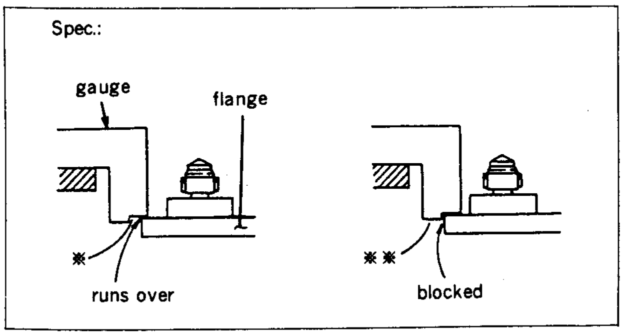
Adjustment

9. Remove the reel table.
10. Adjust the height of the reel table with polyslider washer installed into the reel motor shaft until the specifications are satisied at both L cassette position and S cassette position.

    Polyslider washer for adjustment use:

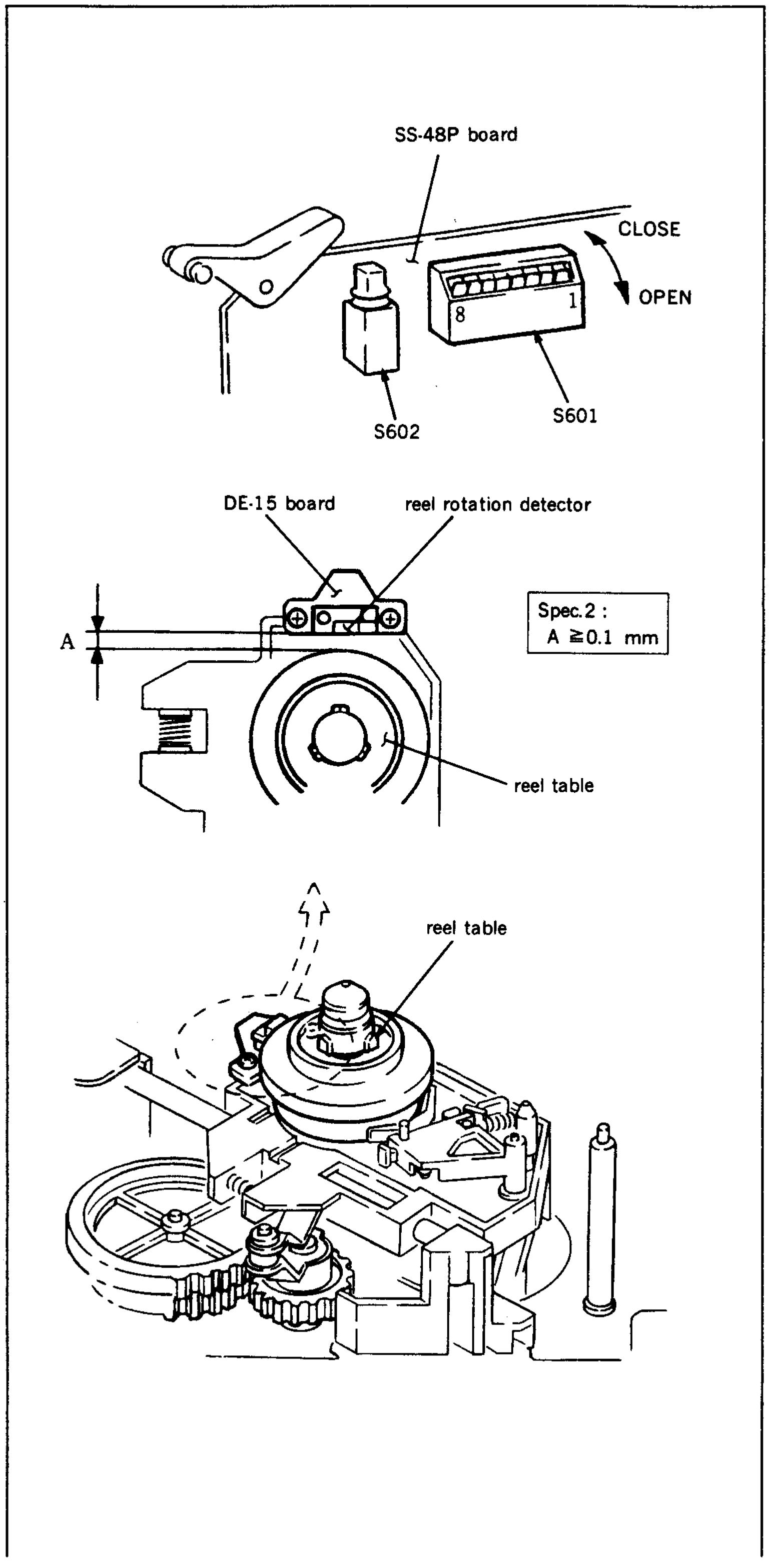
    4 mm dia. 0.13 mm thick : Part No. 3-701-441-01
    4 mm dia. 0.25 mm thick : Part No. 3-701-441-11
    4 mm dia. 0.5 mm thick : Part No. 3-701-441-21
11. After step ⑩ is completed, remove supply and take-up reel tables tentatively, and add one polyslider washer below the reel tables respectively.
    - Under supply reel table : 0.25 mm thick polyslider washer
    - Under take-up reel table : 0.13 mm thick polyslider washer
12. Tighten two fixing screws of the reel table with the L shaped wrench while pressing the supply reel table and/or take-up reel table slightly towards down. (Refer to steps from (1) to (5) in Section 5-10.)





5-10-3. Reel Rotation Detector Position Adjustment

- Be sure to perform this adjustment when a reel rotation detector is replaced.
- Be sure to perform the confirmation when a reel motor and/or reel table is replaced.
- Adjustment of a supply reel rotation detector and take-up reel rotation detector take the same procedure.



Tools

Oscilloscope

Wire clearance gauge : J-6152-450-A

Check

1. Connect the oscilloscope to PD-56 board on a pinch solenoid block as follows :
   S : TP1/PD-56 board
   T : TP2/PD-56 board
2. Put Bit7 of S601 on SS-48P board in CLOSE state.
3. Turn the POWER to ON.
4. Press S602 on SS-48P board. (Reel table begins to rotate.)
5. Make sure that the test point output satisfies the specification 1.
   Make sure that a clearance between a reel table and reel rotation detector satisfies the specification 2.

Specification 1 : No distortion in the waveform as well as 0.4 Vp-p or more.

Specification 2 : A clearance between the reel table and reel rotation detector is more than 0.1 ㎜.

When both specifications 1 and 2 are satisfied, perform step (6) and later.
When either specifications 1 or 2 is not satisfied, perform step ⒄ and later.

6. Turn the POWER to OFF.
7. Turn the POWER to ON again, and press S302 and put the unit into maintenance mode.
8. Press the search dial to enter the jog mode, and move * mark to "B0: SERVO CHECK" which is dispalying on the monitor screen.
9. Press S302 on SS-48P board to select "SERVO CHECK" mode.
10. Move * mark to "B02: MOTOR CHECK" which is dispalying on the monitor screen with the search dial.
11. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
12. Move * mark to "B021 : S REEL" or "B022 : T REEL" which is dispalying the sub-menu on the monitor screen with the search dial.

13. Press S302 on SS-48P board and execute S REEL” or T REEL” sub-menu.
14. When the search dial rotates in the jog mode, make sure that the test point output satisfies the specification 3.

Specification 3 : 0.4 Vp-p or more (no distortion)

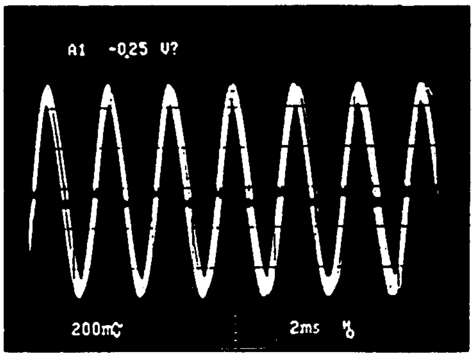
If the specification 3 is satisfied, perform step (15) and later.
If the specification 3 is not satisfied, perform step ⒄ and later.

15. Turn the POWER to OFF.
16. Put Bit7 of S601 on SS-48P board in OPEN state.

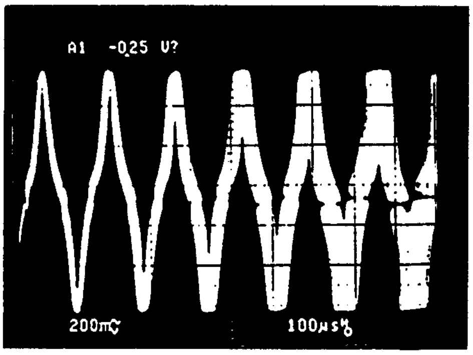
Adjustment

17. Loosen a fixing screw of DE-15 board holding the reel rotation detector for one to two turns.
18. Insert the paper which two folded such as of this service manual between the reel table and reel rotation detector, and press the reel rotation detector slightly towards the reel table. Then tighten a fixing screw.
19. Pull out the folded paper, and make sure that a sheet of paper is easily inserted in this space.
20. Perform the check procedures and make sure that all of the three specifications 1 to 3 are satisfied.
If all of the three specifications are not satisfied, adjust the position of DE-15 board again.
21. Perform reel FG duty adjustment.
(Refer to Section 5-12-3.)

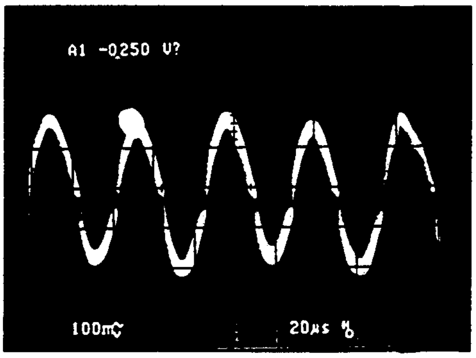
OK



NG
narrower
clearance



NG
wider
clearance



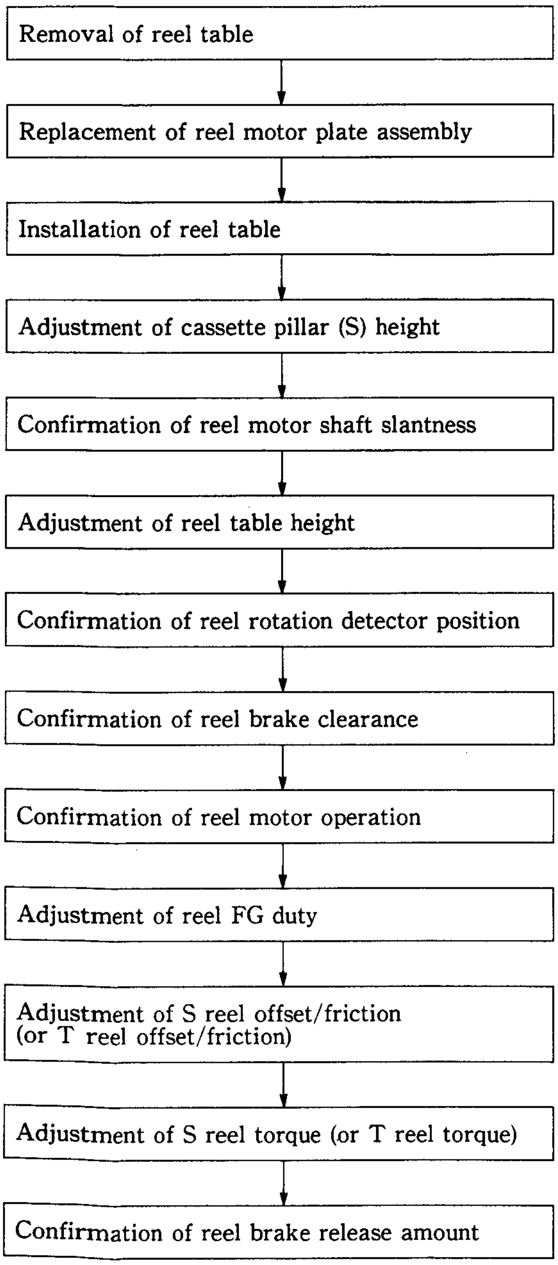
5-11. REEL MOTOR PLATE REPLACEMENT

- Replacement of supply reel motor plate and take-up reel motor plate take the same procedure.

Tools

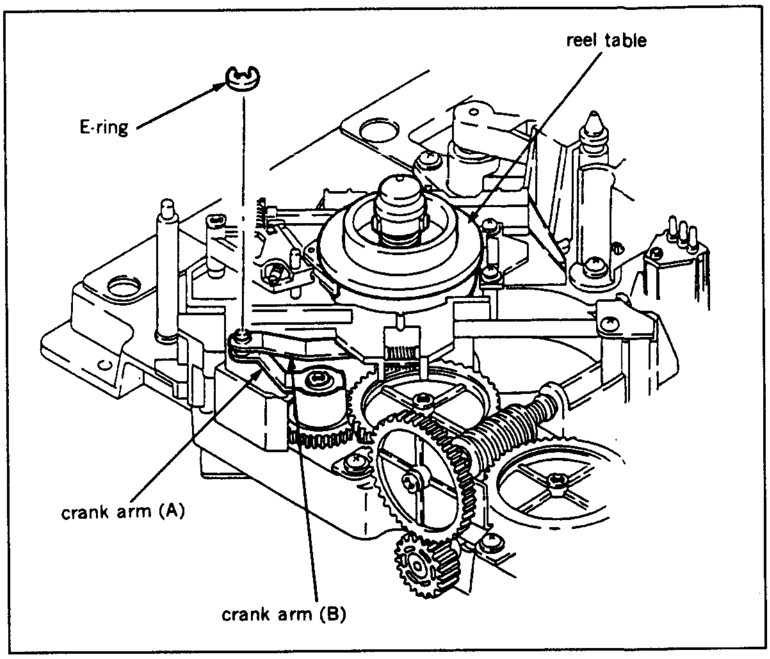
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
L shaped wrench (across flat has 1.5 mm) : 7-700-736-05
Grease (SGL-505) : 7-662-010-04

Replacement flow chart


Removal of reel table
Replacement of reel motor plate assembly
Installation of reel table
Adjustment of cassette pillar (S) height
Confirmation of reel motor shaft slantness
Adjustment of reel table height
Confirmation of reel rotation detector position
Confirmation of reel brake clearance
Confirmation of reel motor operation
Adjustment of reel FG duty
Adjustment of S reel offset/friction (or T reel offset/friction)
Adjustment of S reel torque (or T reel torque)
Confirmation of reel brake release amount

Removal

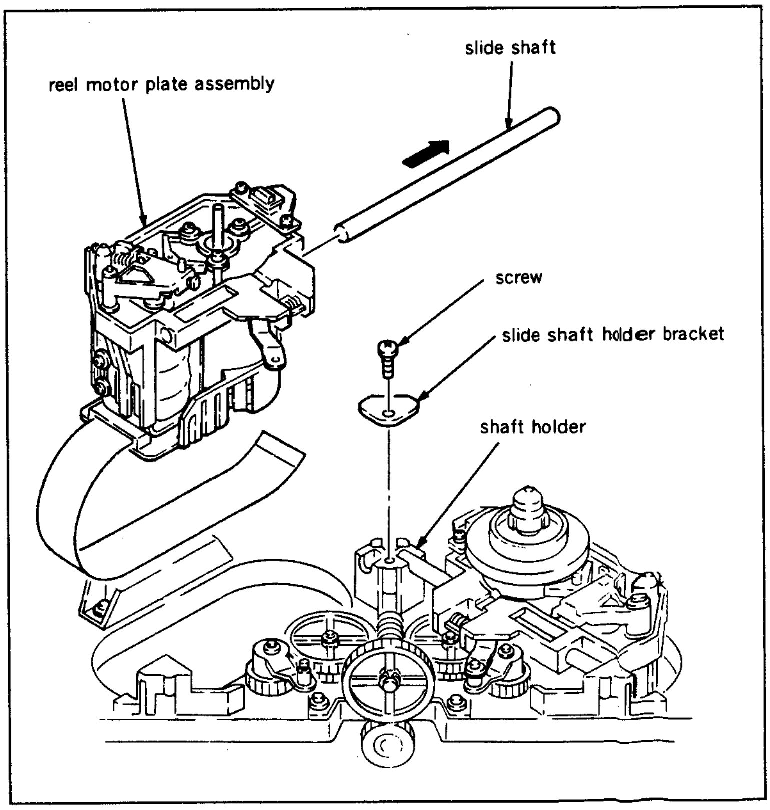
1. Disconnect a flat cable of a reel motor board (RM-82 board) connected with DR-118A board.
2. Remove an E-ring holding a crank arm (B) of a reel motor plate assembly.


reel table
E-ring
crank arm (A)
crank arm (B)

3. Remove a reel table. (Refer to the steps from (1) to (6) in Section 5-10.)
4. Remove a screw shown in the figure, and remove a slide shaft holder bracket.
5. Push a slide shaft towards the direction of arrow and remove it from the reel motor plate assembly.

Note :Pay particular attention not to cause damage to the slide shaft during removal.

6. Lift the reel motor plate assembly, and disconnect the flat cable of the reel motor board (RM-82 board).


slide shaft
reel motor plate assembly
screw
slide shaft holder bracket
shaft holder

Installation

7. Clean the hole where the slide shaft to be inserted of a new reel motor plate assembly with a cleaning piece moistened with cleaning fluid.
8. Clean the slide shaft with a cleaning piece moistened with cleaning fluid.

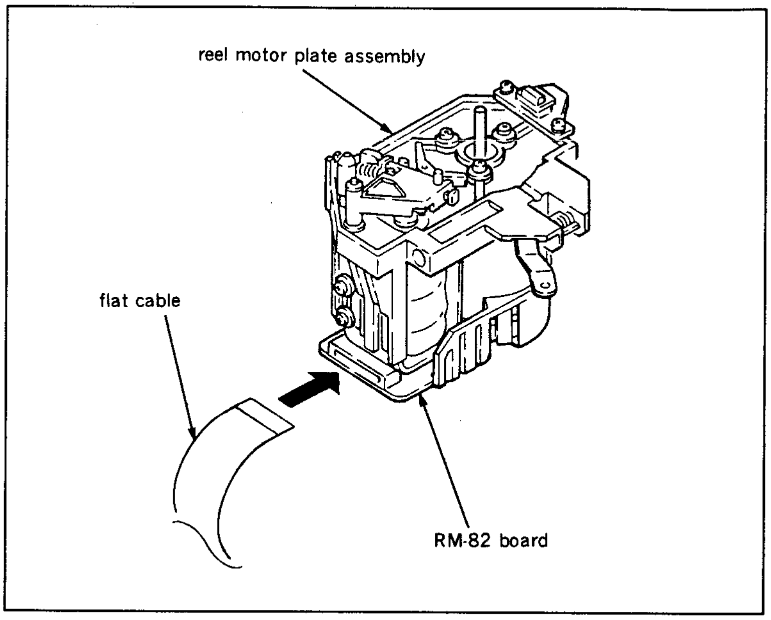
9. Connect the flat cable to the connector of RM-82 board of the new reel motor plate assembly.
10. Insert the slide shaft to the reel motor plate assembly and install it to the unit.

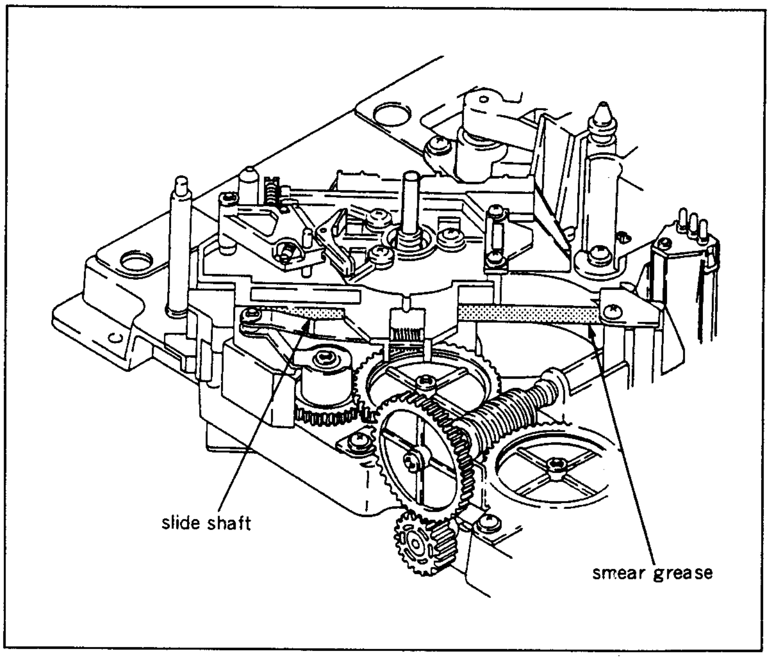
Note :Pay particular attention not cause damage to the slide shaft during installation.

11. After putting the slide shaft into a shaft holder, install the slide shaft bracket with a screw.
    Smear grease very lightly to the place of the slide shaft shown in the figure.
13. Make sure that the reel motor plate assembly moves smoothly when moving it by hand towards S cassette and L cassette positions.
14. Install the crank arm (B) to a crank arm (A) on the chassis with an E-ring.
15. Install the reel table to a reel shaft.

Note :Tighten two fixing screws after the adjustment of reel table height.

16. Connect the flat cable of the reel motor board (RM-82 board) with DR-118A board.





Adjustment after replacement

17. Perform cassette pillar (S) height adjustment. (Refer to Section 5-10-1.)
18. Perform confirmation of reel motor shaft slantness adjustment. (Refer to steps from (1) to (7) in Section 5-12-1.)
19. Perform reel table height adjustment. (Refer to Section 5-10-2.)
20. Perform confirmation of reel rotation detector position adjustment. (Refer to steps from (1) to (5) in Section 5-10-3.)
21. Perform confirmation of reel brake clearance adjustment. (Refer to Section 5-7-1.)
22. Perform confirmation of reel motor operation. (Refer to Section 5-12-2).
23. Perform reel FG duty adjustment. (Refer to Section 5-12-3.)
24. Perform S reel offset/friction (or T reel offset/friction) adjustment. (Refer to Section 5-12-4 or 5-12-6.)
25. Perform S reel torque (or T reel torque) adjustment. (Refer to Section 5-12-5 or 5-12-7.)
26. Perform confirmation of reel brake release amount adjustment. (Refer to steps from (1) to (3) in Section 5-7-2.)

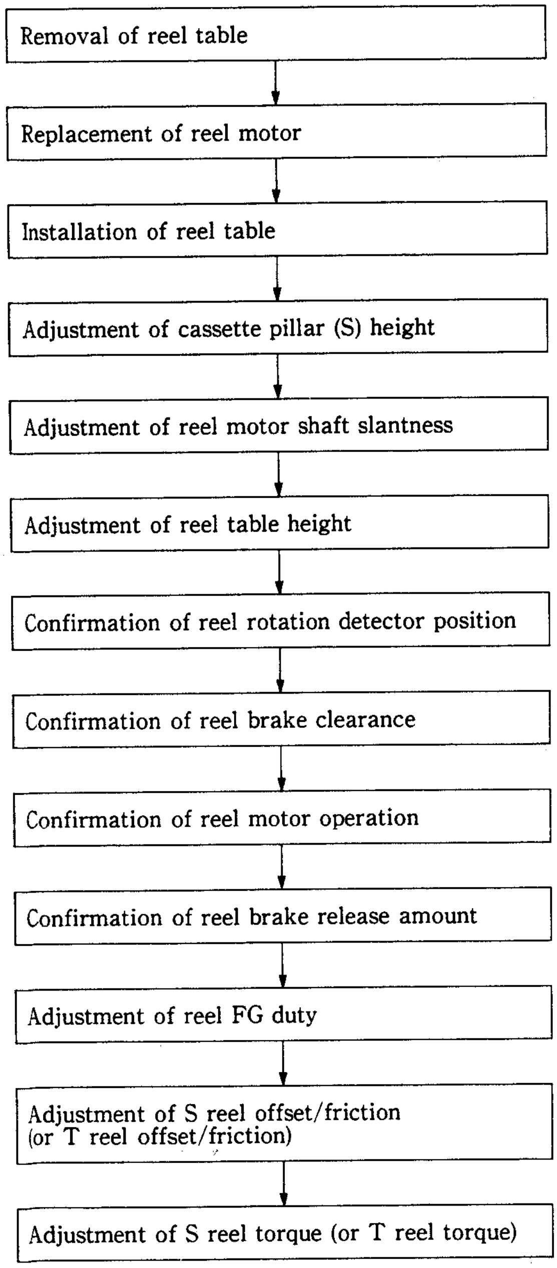
5-12. REEL MOTOR REPLACEMENT

- Replacement of supply reel motor and take-up reel motor take the same procedure.
- Perform the replacement of a reel motor as an assembled part instead of as a component part.

Tools

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
L shaped wrench (across flat has 1.5 mm)
: 7-700-736-05

Replacement flow chart


Removal of reel table
Replacement of reel motor
Installation of reel table
Adjustment of cassette pillar (S) height
Adjustment of reel motor shaft slantness
Adjustment of reel table height
Confirmation of reel rotation detector position
Confirmation of reel brake clearance
Confirmation of reel motor operation
Confirmation of reel brake release amount
Adjustment of reel FG duty
Adjustment of S reel offset/friction (or T reel offset/friction)
Adjustment of S reel torque (or T reel torque)

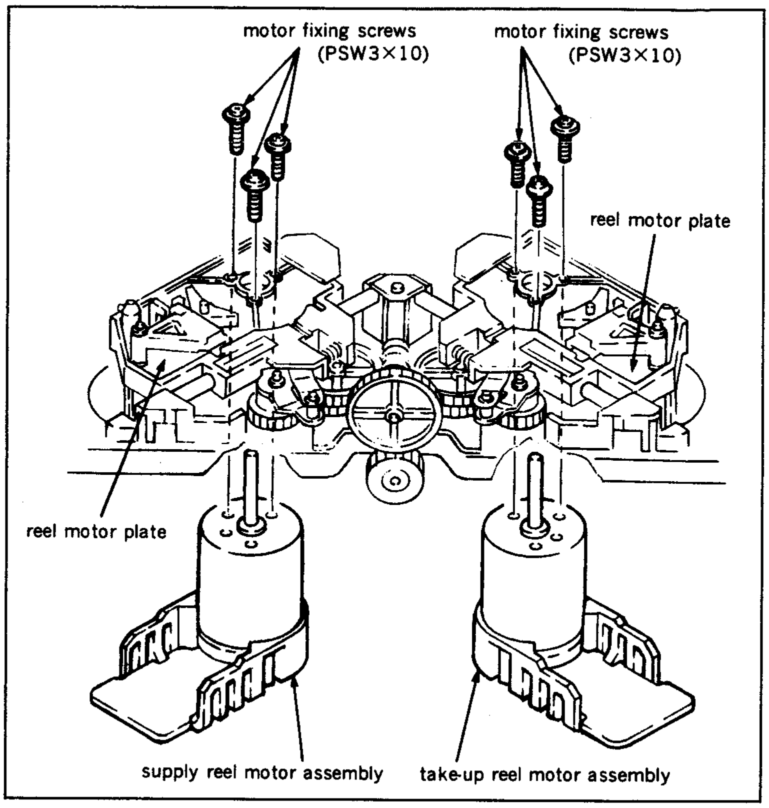
Removal

1. Remove a reel table. (Refer to steps from (1) to (6) in Section 5-10.)
2. Disconnect a flat cable of a reel motor board (RM-82 board) connected with DR-118A board.
3. Disconnect three connectors CN923, CN926 and CN927 of the reel motor board (RM-82 board).
4. Remove three screws (PSW3×10) shown in the figure, and remove a reel motor assembly.

Note 1 : Hold the reel motor assembly to avoid dropping.

Note 2 : Pay particular attention not to lose the spacer using for slantness adjustment since it comes off with the reel motor assembly when its removal.

5. Remove a polyslider washer which is used for the reel table height adjustment from the reel motor shaft.



motor fixing screws (PSW3×10)
motor fixing screws (PSW3×10)
reel motor plate
reel motor plate
supply reel motor assembly
take-up reel motor assembly

Installation

6. Clean the surfaces of a new reel motor assembly and reel motor plate assembly with a cleaning piece moistened with cleaning fluid.
7. Install the new reel motor assembly as in the direction shown in the figure with three screws (PSW3×10).
8. Install the polyslider washer which is removed in step (5) to the reel motor shaft.
9. Connect three connectors CN923, CN926 and CN927 to RM-82 board.
10. Insert the flat cable to RM-82 board.
11. Install the reel table to the reel motor shaft.

Note :Tighten two screws after adjustment of the reel table height.

Adjustment after replacement

12. Perform confirmation of cassette pillar (S) height adjustment. (Refer to steps from (1) to (6) in Section 5-10-1.)
13. Perform reel motor shaft slantness adjustment. (Refer to Section 5-12-1.)
14. Perform reel table height adjustment. (Refer to Section 5-10-2.)
15. Perform confirmation of reel rotation detector position adjustment. (Refer to steps from (1) to (5) in Section 5-10-3).
16. Perform confirmation of reel brake clearance. (Refer to Section 5-7-1.)
17. Perform confirmation of reel motor operetion. (Refer to Section 5-12-2.)
18. Perform confirmation of reel brake release amount.
    (Refer to steps (1) to (3) in Section 5-7-2.)
19. Perform reel FG duty adjustment.
    (Refer to Section 5-12-3.)
20. Perform S reel offset/friction (or T reel offset/friction) adjustment.
    (Refer to Section 5-12-4 or 5-12-6.)
21. Perform S reel torque (or T reel torque) adjustment. (Refer to Section 5-12-5 or 5-12-7.)

5-12-1. Reel Motor Shaft Slantness Adjustment

- Supply reel motor shaft slantness adjustment and take-up reel motor shaft slantness adjustment take the same procedure.
- This adjustment is not necessary in general, however, be sure to perform it when a reel motor and reel motor plate assembly are replaced.
- If this adjustment is not performed correctly, it may cause the occurance of noise due to a cantact of reel hub to a case in a cassette tape, or damage to the tape due to the incorrect tape running.
- In the following adjustment, it is described under the condition that a reel table is already removed from a reel motor shaft.

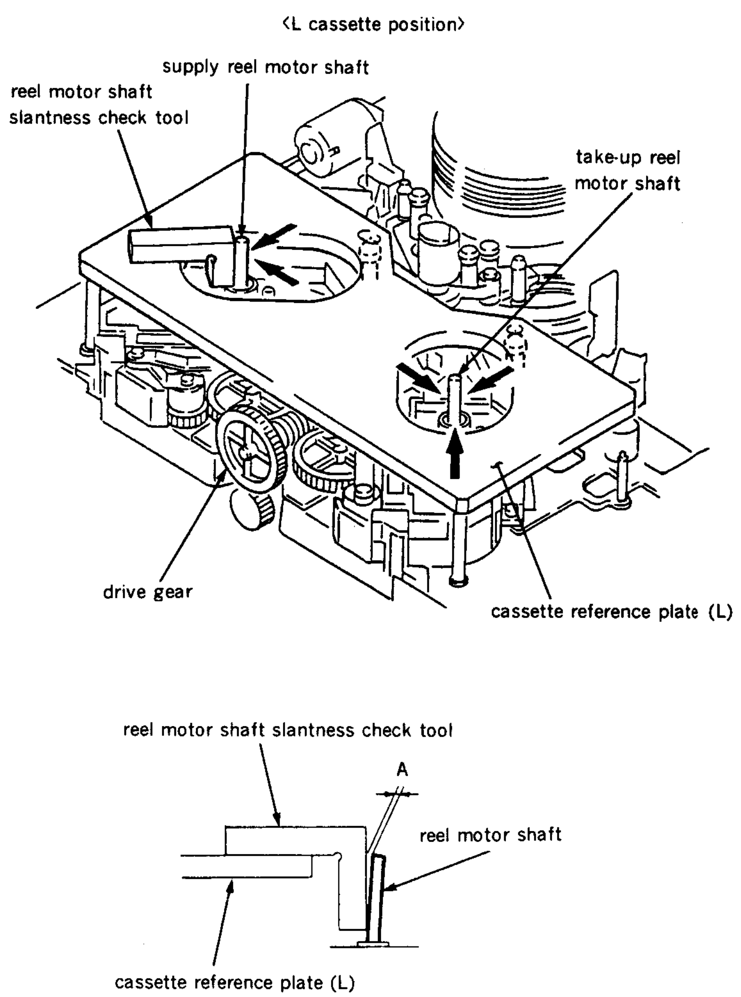
Tools

Cassette reference plate (L): J-6320-880-A
Reel motor shaft slantness check tool
: J-6320-870-A
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Wire clearance gauge : J-6152-450-A

Check

1. Make sure that the unit is in unthreading end mode.
2. Clean the surfaces of the cassette reference plate (L) and reel motor shaft slantness check tool with a cleaning piece moistened with cleaning fluid.
3. Rotate a drive gear by fingers so that a reel table is placed to the L cassette position.
4. Place the cassette reference plate (L) on four cassette pillars.
5. Move the reel motor shaft slantness check tool from three directions of arrows towards supply reel motor shaft or take-up reel motor shaft, and make sure that the clearance between the reel motor shaft and slantness check tool satisfies the specification 1 using the wire clearance gauge.

Specification 1 : Upper or lower clearance between the reel motor shaft and slantness check tool is 0.03 mm or less.


<L cassette position>
supply reel motor shaft
reel motor shaft slantness check tool
take-up reel motor shaft
drive gear
cassette reference plate (L)
reel motor shaft slantness check tool
A
reel motor shaft
cassette reference plate (L)

Spec.1 : (L cassette position)
$A \leqq 0.03$ mm

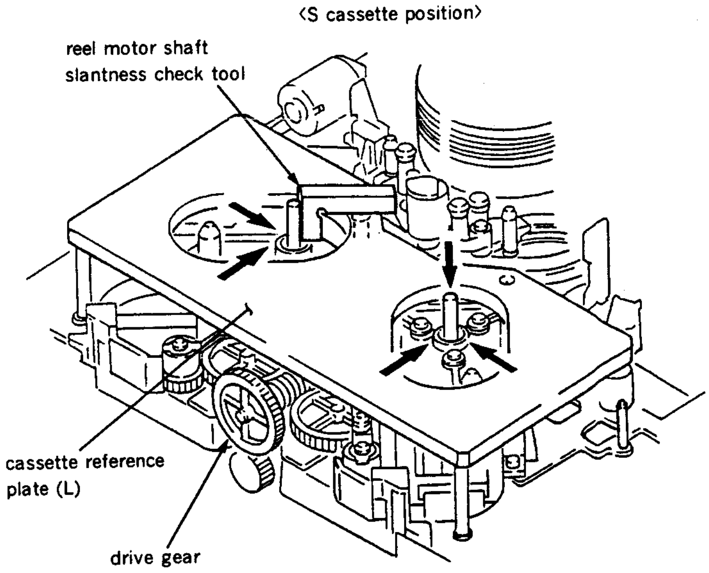
6. Rotate the drive gear by fingers so that the reel table is placed to the S cassette position.
7. Perform step (5), and make sure that the clearance between the reel motor shaft and slantness check tool satisfies the specification 2.

Specification 2 : Upper or lower clearance between the reel motor shaft and slantness check tool is 0.1 mm or less.

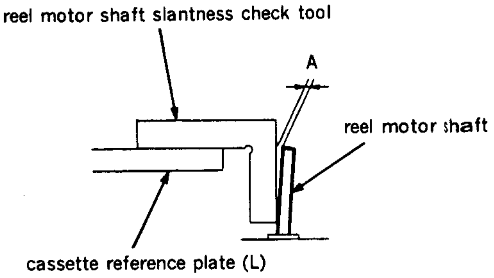
If any specification is not satisfied, perform step (8) and later until the specifications are satisfied at the both positions of the L cassette and S cassette.

Adjustment

8. Bend an adjustment spacer as shown in the figure.
   Adjustment spacer : 3-717-625-01
9. Loosen three screws (PSW3×10) that hold the reel motor for one to two turns.
10. Pick the adjustment spacer with tweezers, and insert it between the chassis at the fixing screw and motor through a square hole by a screw on the reel motor plate assembly.
11. Tighten screws which hold the reel motor, and make sure that the specification is satisfied.
    Repeat the steps from (9) to (11) until the specification is satisfied.
12. Perform the following adjustment after the adjustment:
    Reel table heigh adjustment (Refer to Section 5-10-2.)

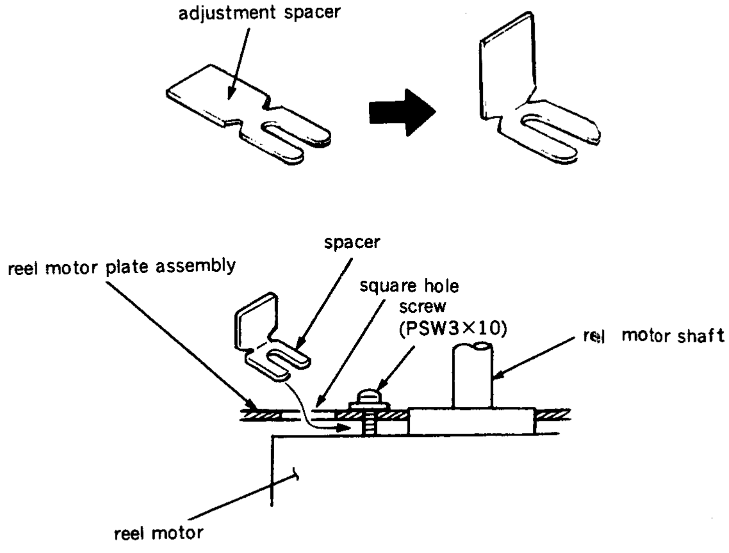


⟨S cassette position⟩
reel motor shaft slantness check tool
cassette reference plate (L)
drive gear



reel motor shaft slantness check tool
A
reel motor shaft
cassette reference plate (L)

Spec.2 : (S cassette position)
A≦0.1 mm



adjustment spacer
spacer
reel motor plate assembly
square hole
screw
(PSW3×10)
rel motor shaft
reel motor

5-12-2. Reel Motor Operation Check

- Be sure to perform the reel motor operation check when a reel motor is replaced.

Preparation

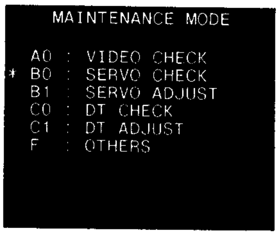
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Put Bit7 of S601 on SS-48P board in CLOSE state.
2. Turn the POWER to ON. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "B0 : SERVO CHECK" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO CHECK" mode.
5. Move * mark to "B02 : MOTOR CHECK" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
7. Move * mark to "B021: S REEL" or "BO22: T REEL" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board and to execute "B021 : S REEL" or "BO22 : T REEL" sub-menu.
9. The message "TURN JOG DIAL IN JOG MODE" will appear on the monitor screen.
   When rotating the search dial at jog mode, make sure that the reel brake is released, and the reel table rotates in the same direction with the search dial.
   If the reel table does not rotate correctly, check the reel motor driver circuit (on DR-118 board).
   After confirming the correct reel table rotation, press S303 twice on SS-48P board to return to the mode screen.
10. After confirmation, turn the POWER to OFF, and put Bit7 of S601 on SS-48P board in OPEN state.

S601-7/SS-48P : CLOSE

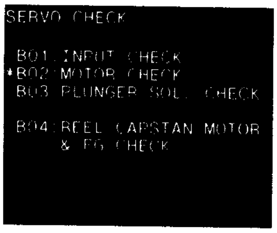
press S302



```
MAINTENANCE MODE

 A0 : VIDEO CHECK
* B0 : SERVO CHECK
 B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

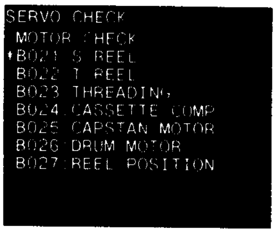
press S302



```
SERVO CHECK

 B01:INPUT CHECK
*B02:MOTOR CHECK
 B03:PLUNGER SOL. CHECK

 B04:REEL CAPSTAN MOTOR
     & FG CHECK
```

select with search dial

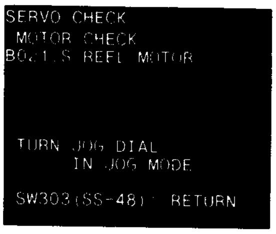
press S302



```
SERVO CHECK
 MOTOR CHECK
*B021:S REEL
 B022:T REEL
 B023:THREADING
 B024:CASSETTE COMP
 B025:CAPSTAN MOTOR
 B026:DRUM MOTOR
 B027:REEL POSITION
```

select with search dial

press S302



```
SERVO CHECK
 MOTOR CHECK
B021:S REEL MOTOR



 TURN JOG DIAL
      IN JOG MODE

 SW303(SS-48) : RETURN
```

turn search dial

reel motor rotation check

press S303 twice

S601-7/SS-48P : OPEN

5-12-3. Reel FG Duty Adjustment

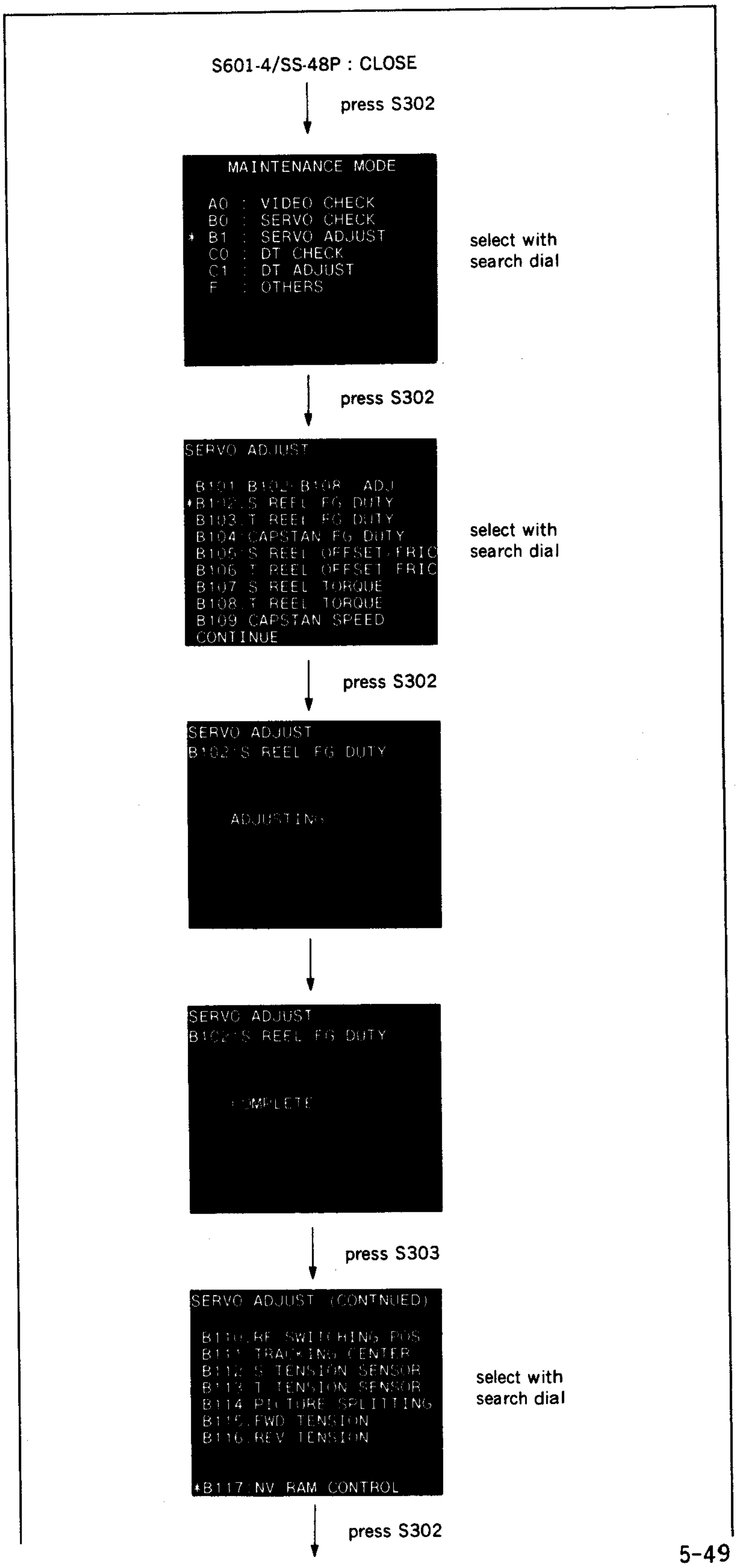
- Be sure to perform the reel FG duty adjustment when a supply or take-up reel motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to the following menu which is displaying on the monitor screen with the search dial.
   When a S reel motor is replaced, move ∗ mark to "B102 : S REEL FG DUTY."
   When a T reel motor is replaced, move ∗ mark to "B103 : T REEL FG DUTY."
6. Press S302 on SS-48P board to execute "S REEL FG DUDY" or "T REEL FG DUTY" menu.
7. Confirm that the message "COMPLETE" is displayed on the monitor screen.
   When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
8. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.



S601-4/SS-48P : CLOSE

press S302

```
MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
*B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

press S302

```
SERVO ADJUST

 B101 B102-B108  ADJ
*B102.S REEL FG DUTY
 B103.T REEL FG DUTY
 B104 CAPSTAN FG DUTY
 B105 S REEL OFFSET FRIC
 B106 T REEL OFFSET FRIC
 B107 S REEL TORQUE
 B108.T REEL TORQUE
 B109 CAPSTAN SPEED
 CONTINUE
```

select with search dial

press S302

```
SERVO ADJUST
B102 S REEL FG DUTY

     ADJUSTING
```

```
SERVO ADJUST
B102 S REEL FG DUTY

     COMPLETE
```

press S303

```
SERVO ADJUST (CONTNUED)

 B110.RF SWITCHING POS
 B111 TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115.FWD TENSION
 B116.REV TENSION


*B117:NV RAM CONTROL
```

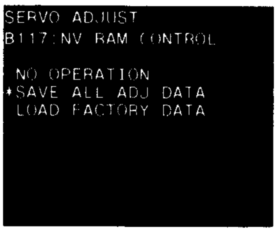
select with search dial

press S302

9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
10. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

Note 1: When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen.
Check the reel rotation detector, reel FG amplifier circuit and reel motor drive circuit (on DR-118A board and SS-48P board).

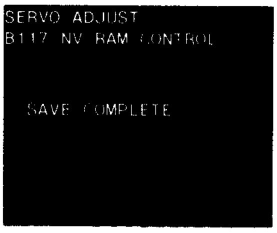
Note 2: When the "SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST
B117:NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL


  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-12-4. S Reel Offset/Friction Adjustment

- Be sure to perform the S reel offset/friction adjustment when a supply reel motor is replaced.

Preparation

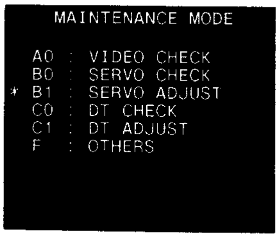
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move * mark to "B105: S REEL OFFSET/FRIC" which is displaying on monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "S REEL OFFSET/FRIC".

S601-4/SS-48P : CLOSE

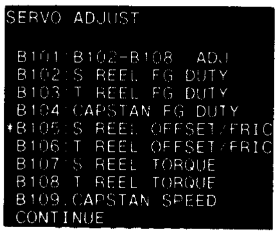
press S302



```
    MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

select with search dial

press S302



```
SERVO ADJUST

 B101:B102-B108  ADJ
 B102:S REEL FG DUTY
 B103:T REEL FG DUTY
 B104:CAPSTAN FG DUTY
*B105:S REEL OFFSET/FRIC
 B106:T REEL OFFSET/FRIC
 B107:S REEL TORQUE
 B108 T REEL TORQUE
 B109.CAPSTAN SPEED
 CONTINUE
```

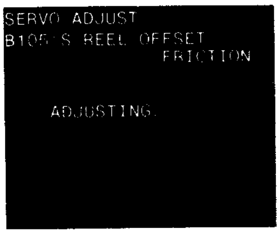
select with search dial

press S302

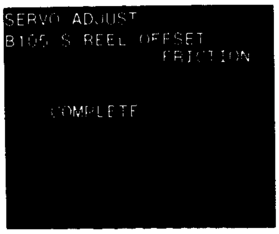
7. Confirm that the message "COMPLETE" is displayed on the monitor screen.
   When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
8. Move * mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
10. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

Note 1: When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen.
Check the reel motor, reel FG duty adjustment and reel motor drive circuit (on DR-118A board).

Note 2: When the "SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.

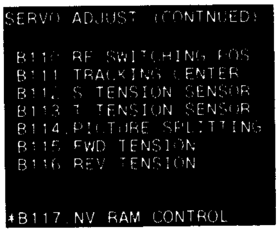


```
SERVO ADJUST
B105 S REEL OFFSET
              FRICTION

    ADJUSTING
```



```
SERVO ADJUST
B105 S REEL OFFSET
              FRICTION

    COMPLETE
```

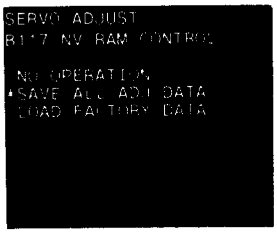
press S303



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS
 B111 TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION

*B117 NV RAM CONTROL
```

select with search dial

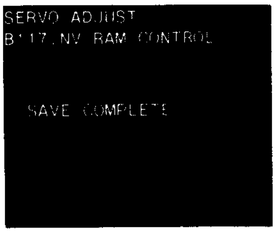
press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-12-5. S Reel Torque Adjustment

- Be sure to perform the S reel torque adjustment when a supply reel motor is replaced.

Preparation

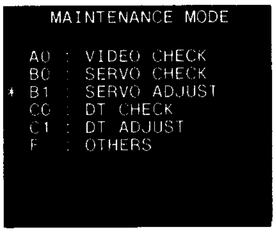
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to "B107: S REEL TORQUE" which is displaying on monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "S REEL TORQUE".
7. Confirm that the message "COMPLETE" is displayed on the monitor screen.
   When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
8. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.

S601-4/SS-48P : CLOSE

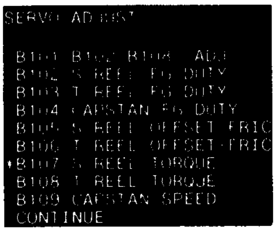
press S302



```
  MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
* B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

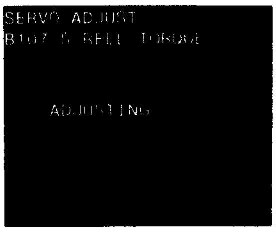
press S302



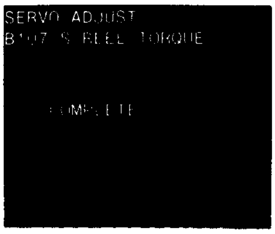
```
SERVO ADJUST

 B101 B102 B104 ADJ
 B102 S REEL FG DUTY
 B103 T REEL FG DUTY
 B104 CAPSTAN FG DUTY
 B105 S REEL OFFSET FRIC
 B106 T REEL OFFSET FRIC
*B107 S REEL TORQUE
 B108 T REEL TORQUE
 B109 CAPSTAN SPEED
 CONTINUE
```

select with search dial

press S302

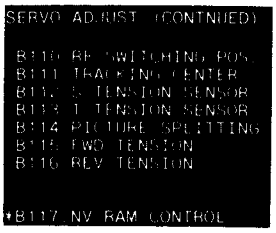


```
SERVO ADJUST
B107 S REEL TORQUE


    ADJUSTING
```



```
SERVO ADJUST
B107 S REEL TORQUE


    COMPLETE
```

press S303



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS.
 B111 TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


*B117 NV RAM CONTROL
```

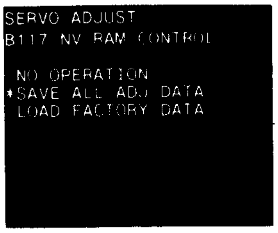
select with search dial

press S302

10. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

Note 1: When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen. Perform reel FG duty adjustment. Check the reel motor drive circuit (on DR-118A board).

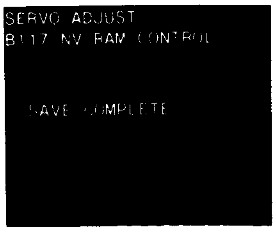
Note 2: When the "SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL


 SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-12-6. T Reel Offset/Friction Adjustment

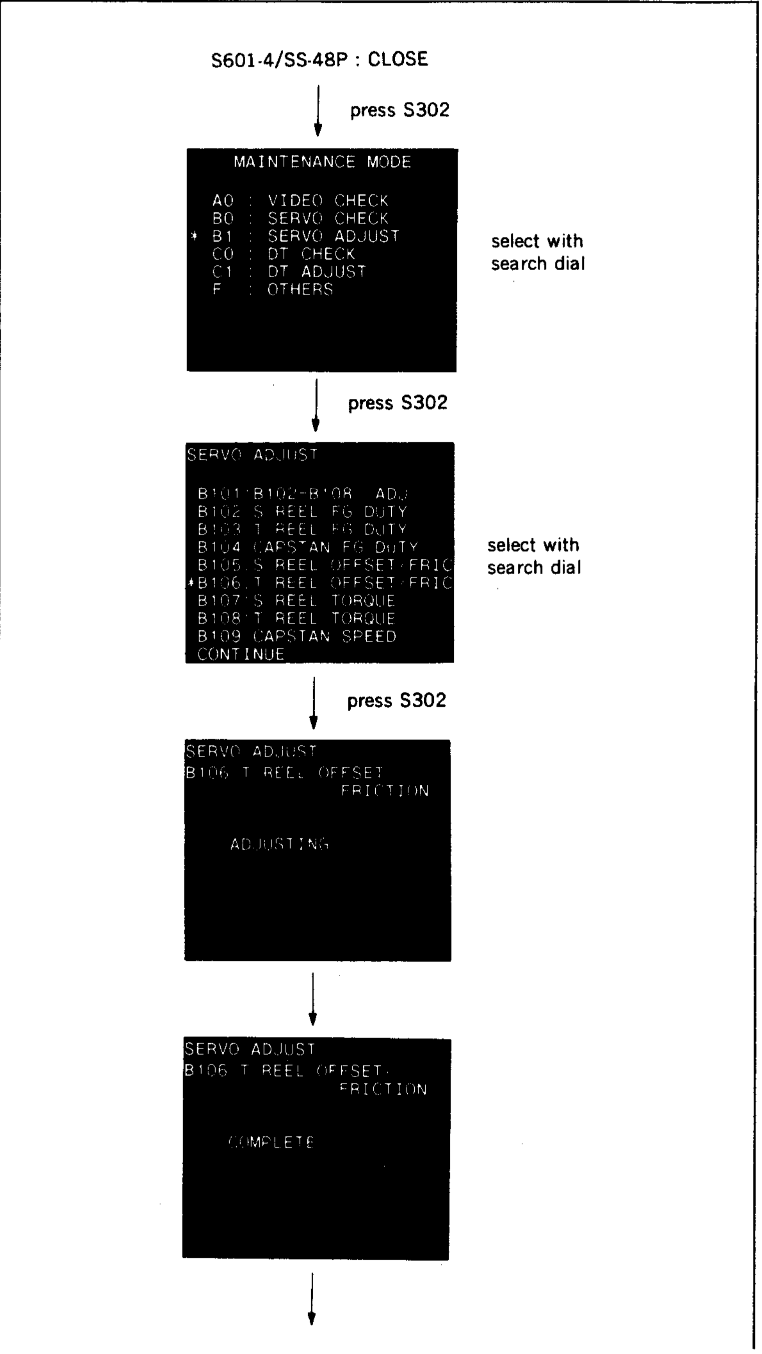
- Be sure to perform the T reel offset/friction adjustment when a take-up reel motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to "B106: T REEL OFFSET/FRIC" which is displaying on monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "T REEL OFFSET/FRIC".
7. Confirm that the message "COMPLETE" is displayed on the monitor screen.
   When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
8. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
10. Move ∗ mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.



```
     MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

```
SERVO ADJUST

 B101 B102-B108  ADJ
 B102 S REEL FG DUTY
 B103 T REEL FG DUTY
 B104 CAPSTAN FG DUTY
 B105 S REEL OFFSET/FRIC
*B106 T REEL OFFSET/FRIC
 B107 S REEL TORQUE
 B108 T REEL TORQUE
 B109 CAPSTAN SPEED
 CONTINUE
```

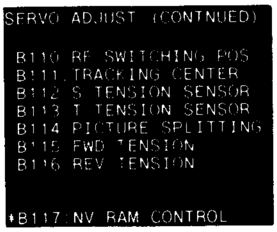
```
SERVO ADJUST
B106 T REEL OFFSET
                 FRICTION

     ADJUSTING
```

```
SERVO ADJUST
B106 T REEL OFFSET/
                 FRICTION

     COMPLETE
```

Note 1: When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen.
Check the reel motor, reel FG duty adjustment and reel motor drive circuit (on DR-118A board).

Note 2: When the "SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.

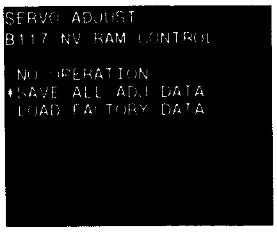
press S303



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS
 B111.TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


*B117:NV RAM CONTROL
```

select with search Dial

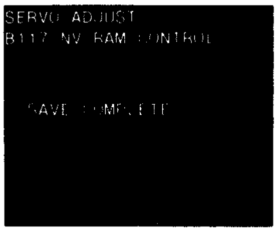
press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL



  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-12-7. T Reel Torque Adjustment

- Be sure to perform the T reel torque adjustment when a take-up reel motor is replaced.

Preparation

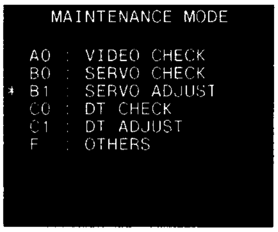
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move * mark to "B108: T REEL TORQUE" which is displaying on monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "T REEL TORQUE".
7. Confirm that the message "COMPLETE" is displayed on the monitor screen. When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
8. Move * mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.

S601-4/SS-48P : CLOSE

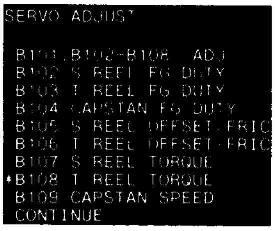
press S302



```
   MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
*B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

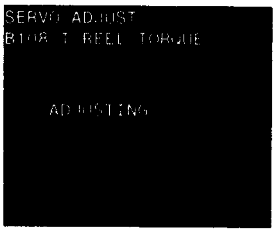
press S302



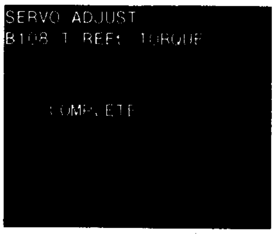
```
SERVO ADJUST

 B101:B102-B108  ADJ
 B102:S REEL FG DUTY
 B103:T REEL FG DUTY
 B104:CAPSTAN FG DUTY
 B105:S REEL OFFSET FRIC
 B106:T REEL OFFSET FRIC
 B107:S REEL TORQUE
*B108:T REEL TORQUE
 B109:CAPSTAN SPEED
 CONTINUE
```

select with search dial

press S302

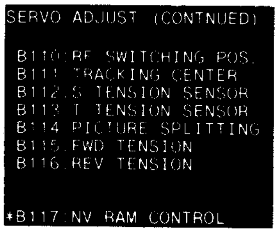


```
SERVO ADJUST
B108:T REEL TORQUE

    ADJUSTING
```



```
SERVO ADJUST
B108:T REEL TORQUE

    COMPLETE
```

press S303



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


*B117:NV RAM CONTROL
```

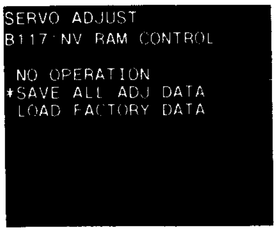
select with search dial

9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
10. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

Note 1: When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen. Perform reel FG duty adjustment. Check the reel motor drive circuit (on DR-118A board).

Note 2: When the "SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.

press S302

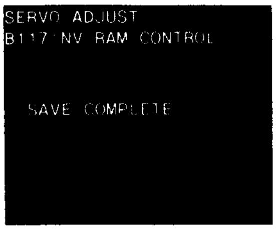


SERVO ADJUST
B117:NV RAM CONTROL

NO OPERATION
*SAVE ALL ADJ DATA
LOAD FACTORY DATA

select with search dial

press S302



SERVO ADJUST
B117:NV RAM CONTROL

SAVE COMPLETE

press S303 twice

S601-4/SS-48P : OPEN

5-13. REEL POSITION MOTOR REPLACEMENT

Tools

L shaped wrench (across flat has 0.89 mm)
: 7-700-736-06
Wire clearance gauge : J-6152-450-A

Replacement flow chart

Replacement of reel position motor

↓

Confirmation of reel position motor operation

Removal

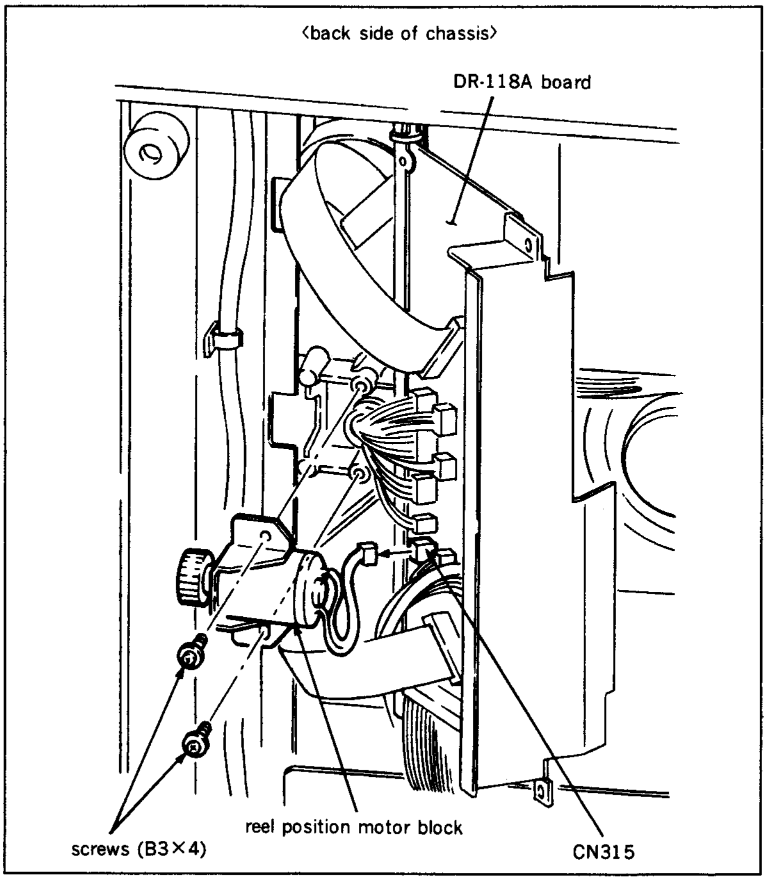
1. Open DR-118A board.
2. Disconnect a connecter CN315 of the reel position motor from DR-118A board.
3. Remove two screws (PWH3×8) shown in the figure, and remove a reel position motor block.
4. Loosen two setscrews of a gear M, and remove the gear M from the reel position motor shaft.
5. Remove two screws (B3×4), and remove a reel position motor.
6. Unsloder two lead wires of the reel position motor.

Installation

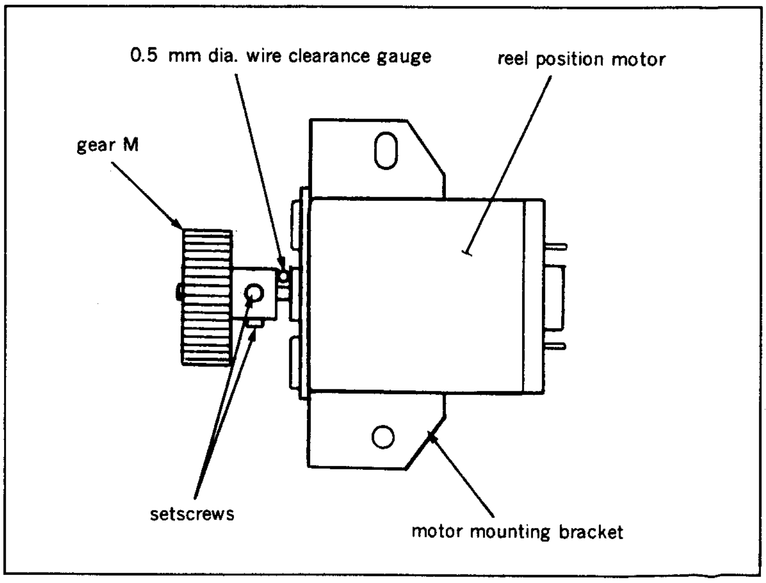
7. Solder two lead wires unsoldered in step (6) to a new reel position motor.
   Solder a yellow leed wire to + terminal
8. Install the new reel position motor to a motor mounting bracket as the yellow lead wire faces in the direction of a S reel table.
9. Insert the gear M to the reel position motor shaft.
10. Put the wire clearance gauge (0.5 mm) between the gear M and boss of the motor, and tighen two setscrews while pressing the gear M towards the motor side.
11. Install the reel position motor block to the chassis with two screws (PWH3×8).
12. Connect the reel position motor connector to CN315 on DR-118A board.

Adjustment after replacement

13. Perform confirmation of reel position motor operation. (Refer to Section 5-13-1.).



<back side of chassis>
DR-118A board
screws (B3×4)
reel position motor block
CN315



0.5 mm dia. wire clearance gauge
reel position motor
gear M
setscrews
motor mounting bracket

5-13-1. Reel Position Motor Operation Check

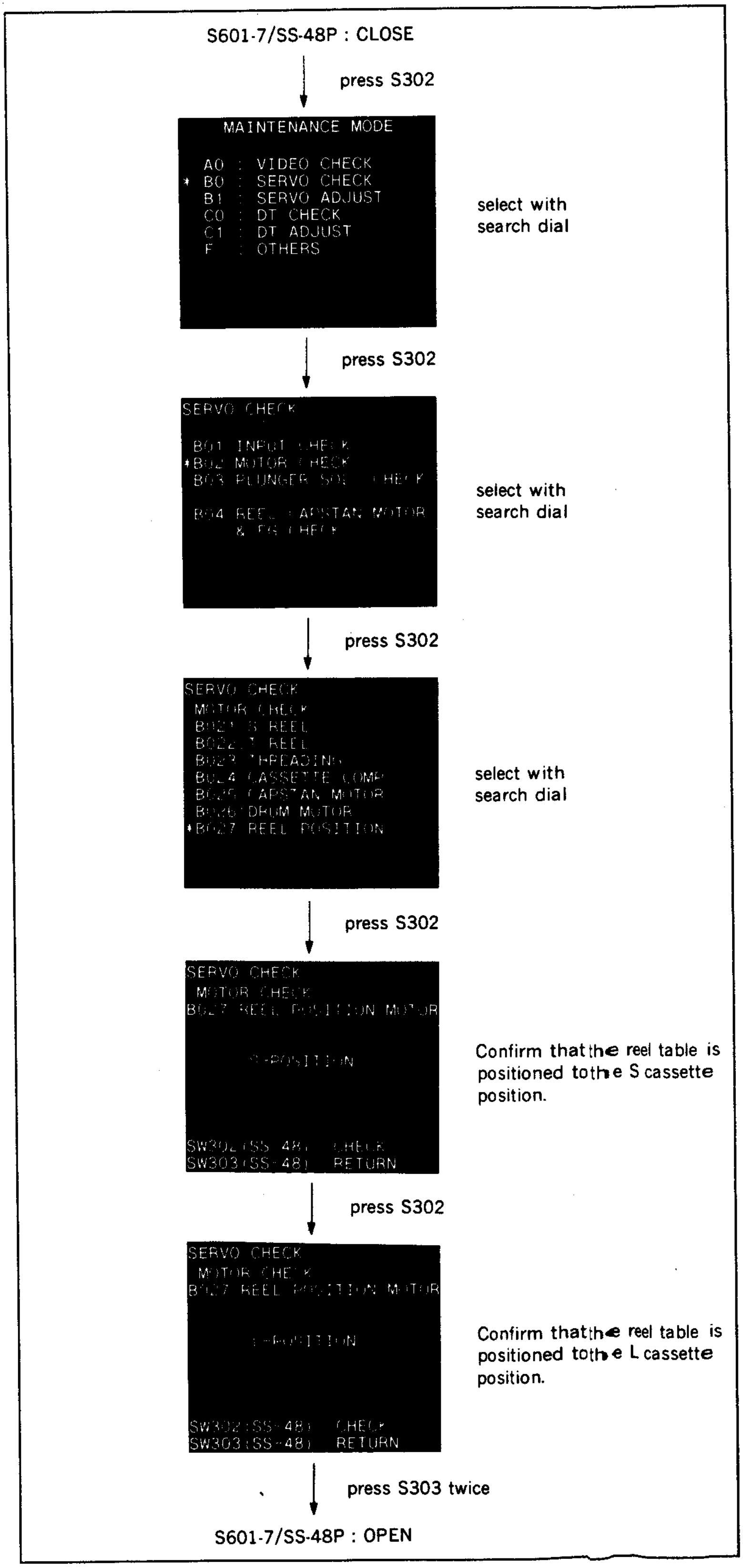
- Be sure to perform the reel position motor operation check when a reel position motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

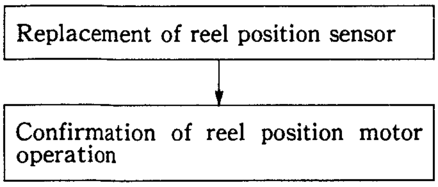
Check

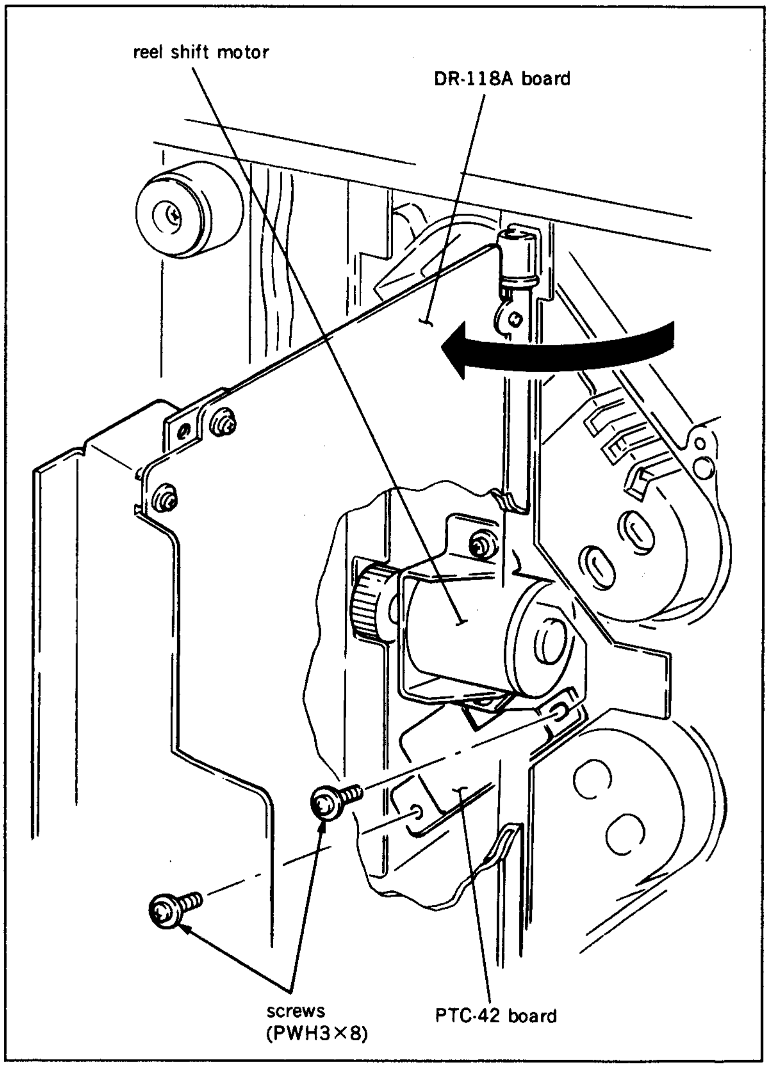
1. Put Bit7 of S601 on SS-48P board in CLOSE state.
2. Turn the POWER to ON. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B0: SERVO CHECK" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO CHECK" mode.
5. Move ∗ mark to "B02: MOTOR CHECK" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
7. Move ∗ mark to "B027: REEL POSITION" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board to execute "REEL POSITION" sub-menu.
9. Press S302 on SS-48P board, make sure that a reel table moves.
   When the reel table is positioned to the S cassette position, confirm that the message "S-POSITION" is displayed on the monitor screen.
   When the reel table is positioned to the L cassette position, confirm that the message "L-POSITION" is displayed on the monitor screen.
   If the message does not apper on the monitor screen, check the reel position motor driver circuit (on DR-118A board) and reel position switch operates normally.
10. Press S303 twice on SS-48P board to return to the mode screen.
11. After confirmation, turn the POWER to OFF, and put Bit7 of S601 on SS-48P board in OPEN state.


S601-7/SS-48P : CLOSE
press S302
MAINTENANCE MODE
A0 : VIDEO CHECK
* B0 : SERVO CHECK
B1 : SERVO ADJUST
C0 : DT CHECK
C1 : DT ADJUST
F : OTHERS
select with search dial
press S302
SERVO CHECK
B01 INPUT CHECK
*B02 MOTOR CHECK
B03 PLUNGER SOL CHECK
B04 REEL CAPSTAN MOTOR & FG CHECK
select with search dial
press S302
SERVO CHECK
MOTOR CHECK
B021 S REEL
B022 T REEL
B023 THREADING
B024 CASSETTE COMP
B025 CAPSTAN MOTOR
B026 DRUM MOTOR
*B027 REEL POSITION
select with search dial
press S302
SERVO CHECK
MOTOR CHECK
B027 REEL POSITION MOTOR
S-POSITION
SW302(SS-48) CHECK
SW303(SS-48) RETURN
Confirm that the reel table is positioned to the S cassette position.
press S302
SERVO CHECK
MOTOR CHECK
B027 REEL POSITION MOTOR
L-POSITION
SW302(SS-48) CHECK
SW303(SS-48) RETURN
Confirm that the reel table is positioned to the L cassette position.
press S303 twice
S601-7/SS-48P : OPEN

5-14. REEL POSITION SENSOR REPLACEMENT

Replacement flow chart


Replacement of reel position sensor
Confirmation of reel position motor operation


reel shift motor
DR-118A board
screws (PWH3×8)
PTC-42 board

Removal

1. Open DR-118A board.
2. Remove two screws (PWH3×8) that holds PTC-42 board where a reel position sensors are mounted.
3. Disconnect connector CN924 while lifting PTC-42 board.
4. Unsolder the reel position sensor.

Installation

5. Mount a new reel position sensor to match a polarity that is silk screened on PTC-42 board.
6. Connect connector CN924 to PTC-42 board, and install it to the chassis.

Adjustment after replacement

7. Perform reel position motor operation check. (Refer to Section 5-13-1.)

5-15. THREADING MOTOR REPLACEMENT

Tools

L shaped wrench (across flat has 1.27 mm)
: 7-700-736-01
Wire clearance gauge : J-6152-450-A

Replacement flow chart

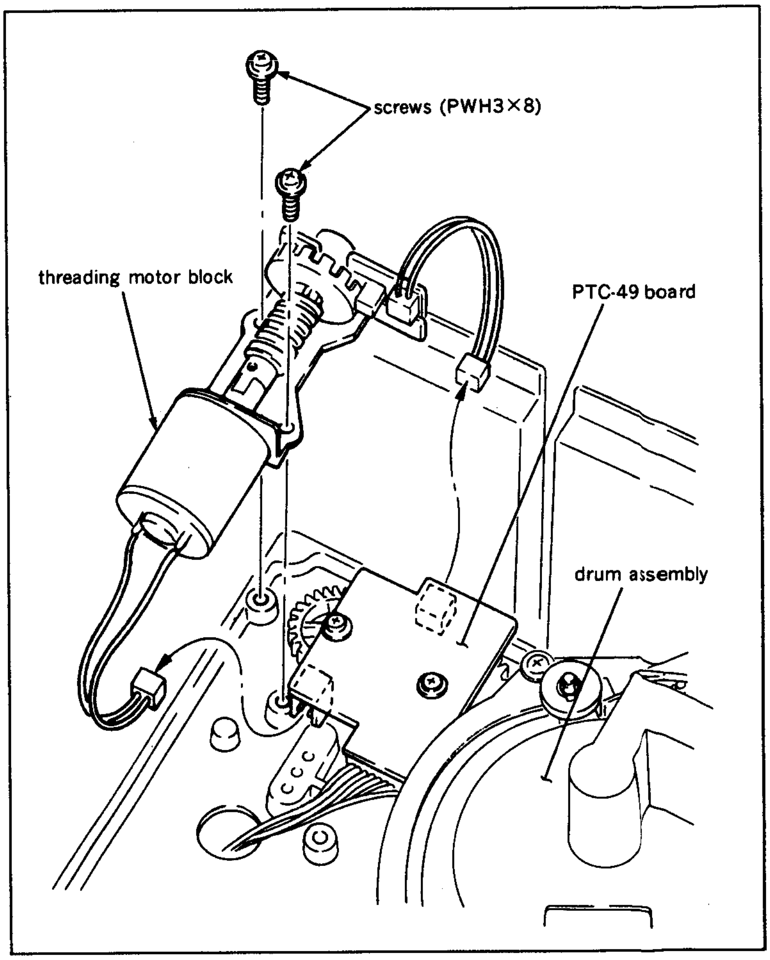
Replacement of threading motor

↓

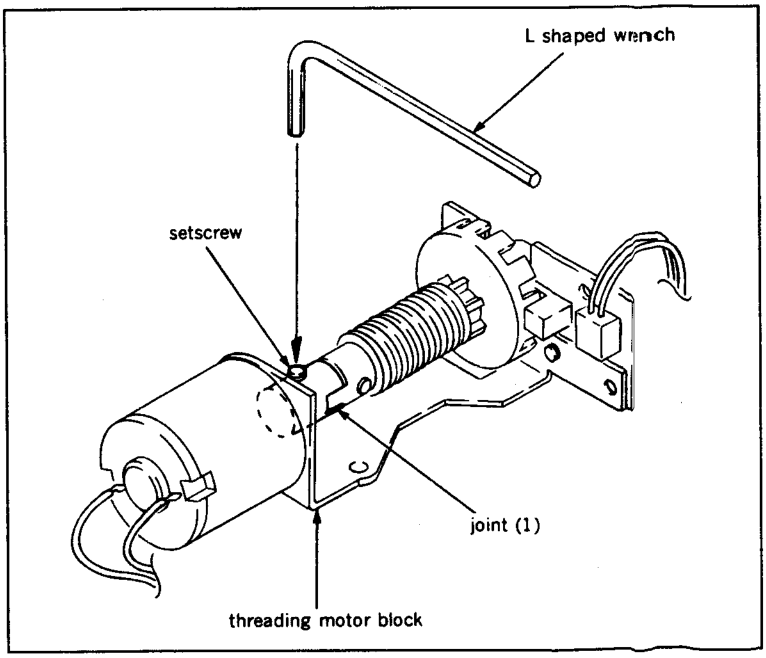
Confirmation of threading motor operation

Removal

1. Disconnect connectors CN903 and CN902 from PTC-49 board.
2. Remove two screws (PWH3×8) shown in the figure, and remove a threading motor block.


screws (PWH3×8)
threading motor block
PTC-49 board
drum assembly

3. Loosen a setscrew of a joint (1) with L shaped wrench.
4. Remove two screws (B3×4), and remove a threading motor.
5. Unsolder two lead wires from the threading motor.

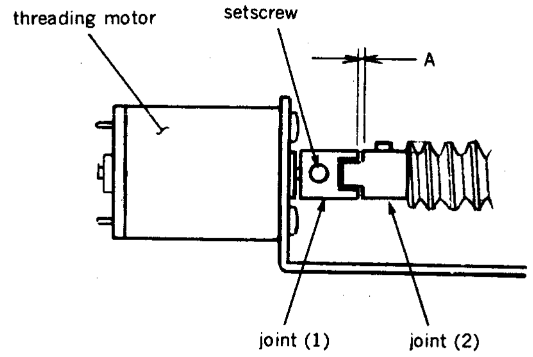

L shaped wrench
setscrew
joint (1)
threading motor block

Installation

6. Solder two lead wires which are unsoldered in step (5) to a new threading motor.

Note :Solder brown lead wire to plus terminal.

7. After a threading motor shaft is pass through a hole of the threading motor bracket, and insert the joint (1) to the motor shaft.
8. Install the threading motor to the threading motor bracket with two screws (B3×4) so that the following two requirements are satisfied:
   - The brown lead wire must face in the direction of the drum when installing to the threading motor bracket.
   - Engage the joint (1) with the joint (2) of the worm assembly.
9. Install the joint (1) to the motor shaft with a setscrew so that the clearance between the joints (1) and (2) satisfies the specification.
10. Make sure that the threading motor rotation detection ring rotates smoothly when it is turned by fingers.
11. Install the threading motor block to chassis with two screws (PWH3×8).
12. Connect the connectors CN903 and CN902 to PTC-49 board.



Spec.: 0.5 mm≦A≦0.8 mm

Adjustment after replacement

13. Perform threading motor operation check. (Refer to Section 5-15-1.)

5-15-1. Threading Motor Operation Check

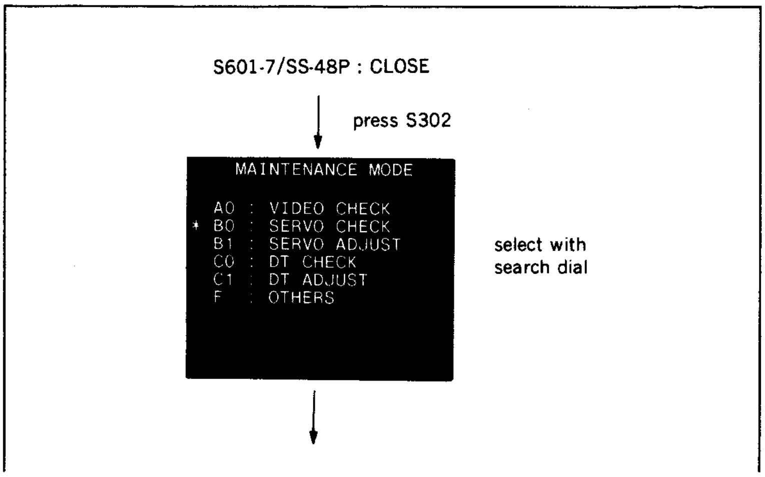
- Be sure to perform the theading motor operation check when a threading motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

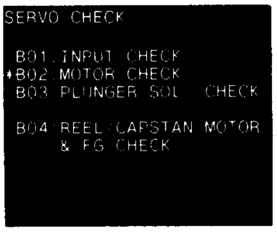
1. Put Bit7 of S601 on SS-48P board in CLOSE state.
2. Turn the POWER to ON. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "BO: SERVO CHECK" which is displaying on the monitor screen with the search dial.



```
    MAINTENANCE MODE

  A0 : VIDEO CHECK
* B0 : SERVO CHECK
  B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

4. Press S302 on SS-48P board to select "SERVO CHECK" mode.
5. Move ✱ mark to "BO2: MOTOR CHECK" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
7. Move ✱ mark to "BO23: THREADING" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board to execute "THREADING" sub-menu.
9. Message "TURN JOG DIAL IN JOG MODE, FWD : THREAD, REV : UNTH" will appear on the monitor screen.
   Then turn the search dial to the direction of FWD according to the message, make sure that the threading motor rotates in the threading direction, and message on the screen changes into "THREAD END".
10. Turn the search dial to the direction of REV. Make sure that the threading motor rotates in the unthreading direction, and message on the screen changes into "UNTHREAD END".
    If the message does not appear, check the loading motor drive circuit, loading FG amplifier (on DR-118A board) and to make sure that the loading TOP/END switch operates normally.
11. Press S303 twice on SS-48P board to return to the mode screen.
12. After confirmation, turn the POWER to OFF, and put Bit7 of S601 on SS-48P board in OPEN state.

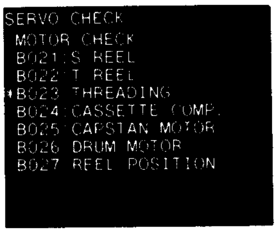
press S302



```
SERVO CHECK

 B01.INPUT CHECK
*B02.MOTOR CHECK
 B03 PLUNGER SOL  CHECK

 B04 REEL CAPSTAN MOTOR
     & FG CHECK
```

select with search dial

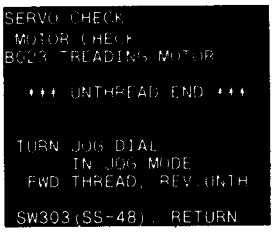
press S302



```
SERVO CHECK
 MOTOR CHECK
 B021:S REEL
 B022 T REEL
*B023 THREADING
 B024:CASSETTE COMP.
 B025 CAPSTAN MOTOR
 B026 DRUM MOTOR
 B027 REEL POSITION
```

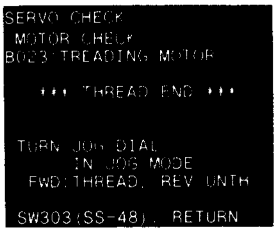
select with search dial

press S302



```
SERVO CHECK
 MOTOR CHECK
B023 TREADING MOTOR

  *** UNTHREAD END ***

 TURN JOG DIAL
      IN JOG MODE
  FWD THREAD, REV.UNTH

 SW303(SS-48). RETURN
```

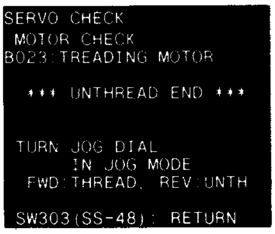
turn search dial to the direction of FWD



```
SERVO CHECK
 MOTOR CHECK
B023:TREADING MOTOR

   *** THREAD END ***

 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV UNTH

 SW303(SS-48). RETURN
```

Make sure that the unit is in the unthreading end state.

turn search dial to the direction of REV



```
SERVO CHECK
 MOTOR CHECK
B023:TREADING MOTOR

  *** UNTHREAD END ***

 TURN JOG DIAL
      IN JOG MODE
  FWD:THREAD, REV:UNTH

 SW303(SS-48): RETURN
```

Make sure that the unit is in the threading end state.

press S303 twice

S601-4/SS-48P : OPEN

5-16. S SLIDER ASSEMBLY REPLACEMENT

Tools

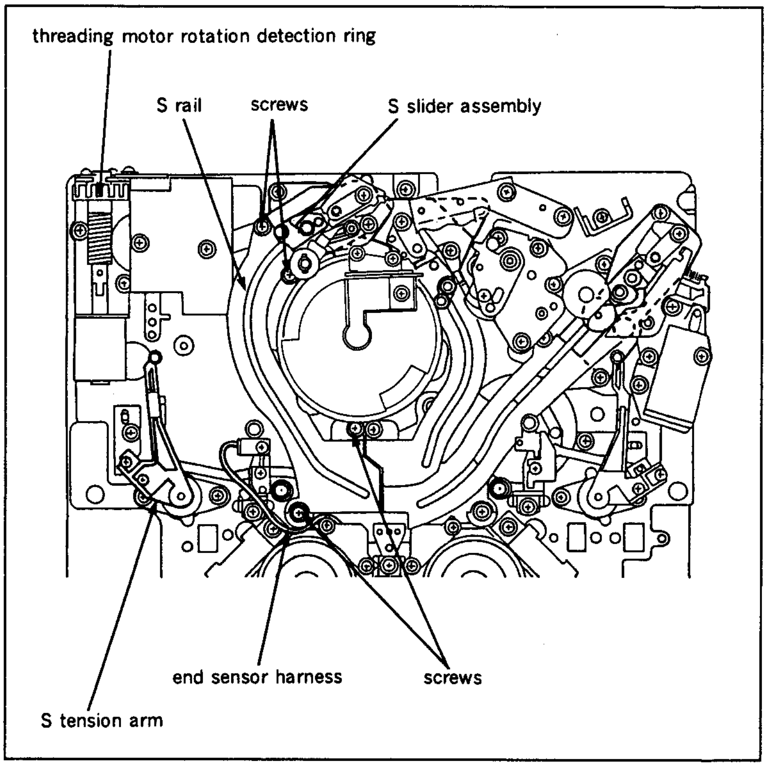
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Molyton grease	: 7-662-001-41

Replacement flow chart

Replacement of S slider assembly

↓

Adjustment of tape running

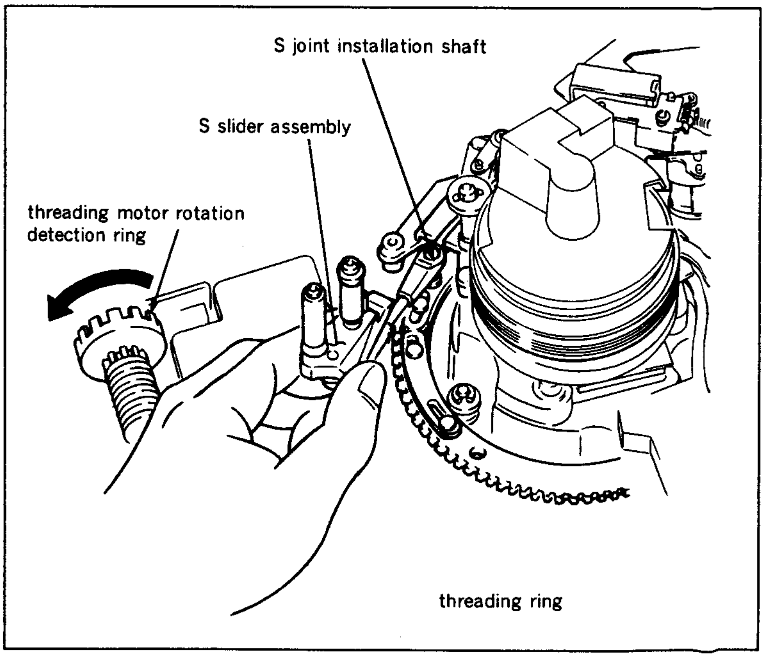

threading motor rotation detection ring
S rail
screws
S slider assembly
end sensor harness
screws
S tension arm

Removal

1. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking it from the front, and put a S slider assmbly to 5 mm back from the threading completion mode. At this time S, T and P slider assemblies are moved on ST base and P base.
2. Unhook an end sensor harness as shown in the figure from a clamper of a S rail.
3. Remove four screws (PWH3×8) that holds the S rail, and remove the S rail.

Note :Pay particular attention not to cause damage to a drum and tape guide during removal.

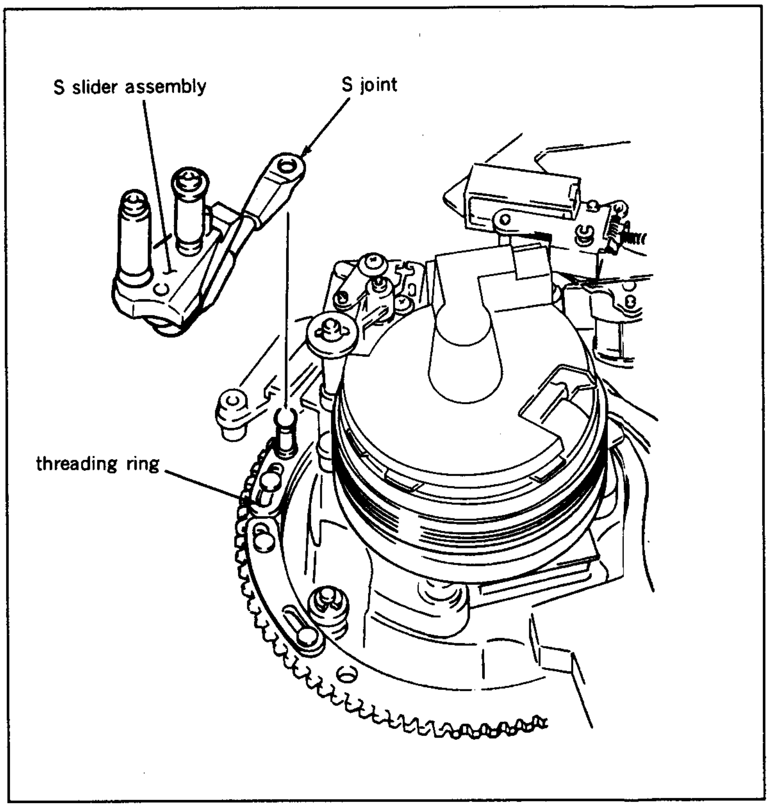
4. Hold the S slider assembly with hand and turn the motor rotation detection ring of the threading motor block in the counterclockwise direction by fingers until the S joint installation shaft on a threading ring comes to the position as shown in the figure.


S joint installation shaft
S slider assembly
threading motor rotation detection ring
threading ring

5. Remove the S joint from a shaft on the threading ring, and remove the S slider assembly from the unit.

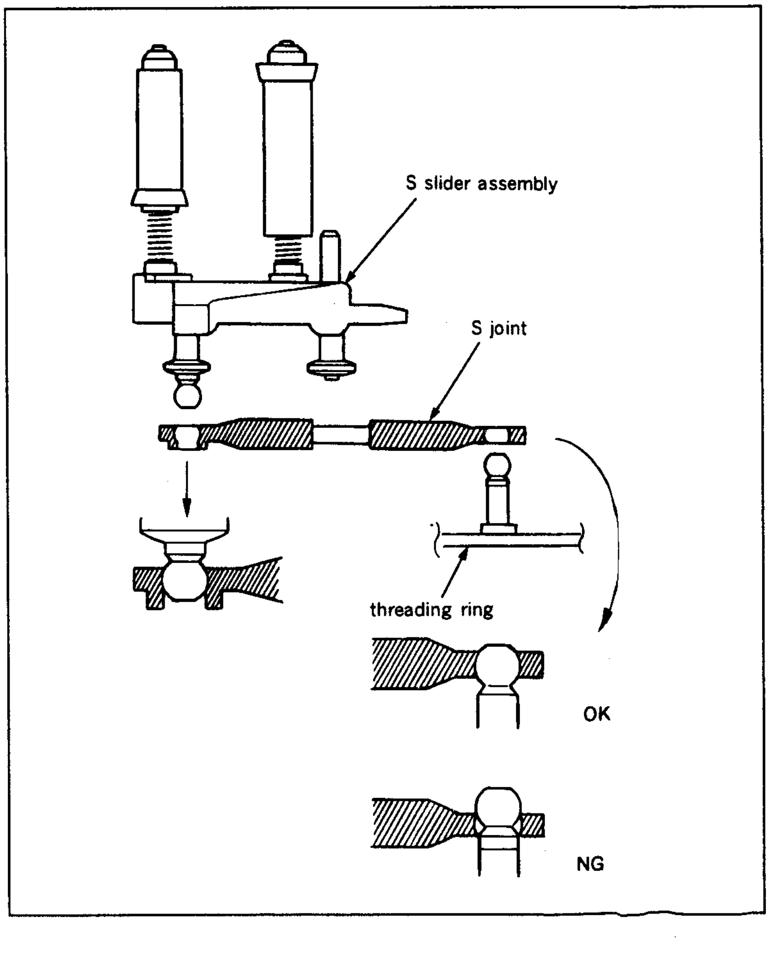
Note :Pay particular attention not to cause damage to the drum during removal.

6. Remove the S joint from the S slider assembly.

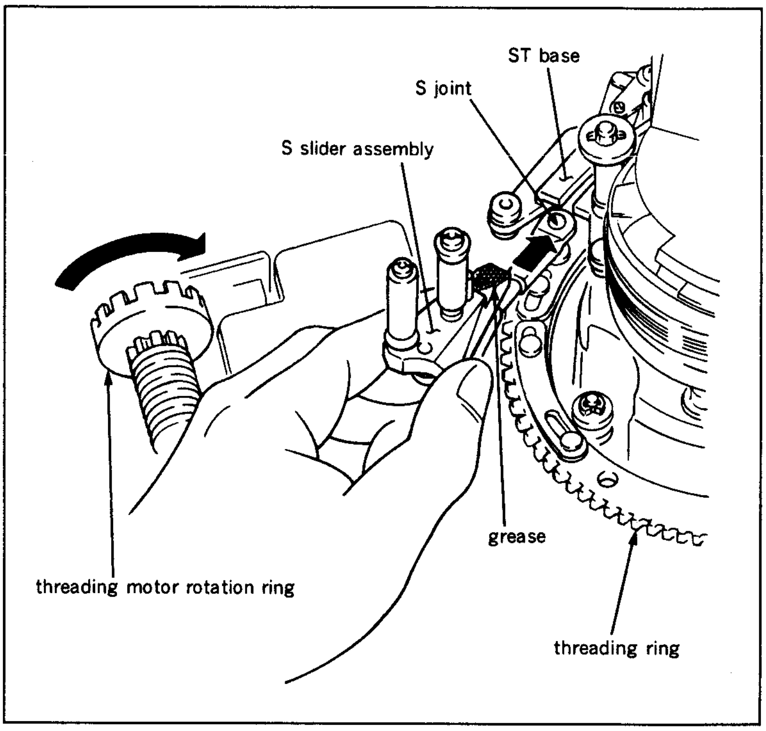

S slider assembly
S joint
threading ring

Installation

7. Clean the contacting surfaces of the S rail with the S slider assembly with a cleaning piece moistened with cleaning fluid.
8. Clean the contacting surfaces of a new S slider assembly with the S rail with a cleaning piece moistened with cleaning fluid.
9. Insert the S joint to the S slider assembly as show in the figure.

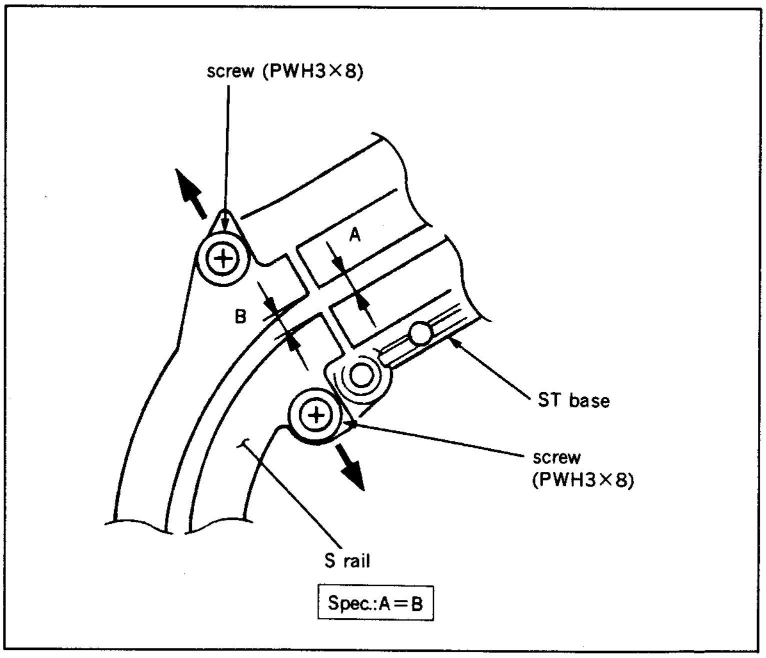

S slider assembly
S joint
threading ring
OK
NG

10. Insert the other end of the S joint into the shaft on the threading ring.
11. Hold the S slider assembly with hand and turn the motor rotation detection ring of the threading motor block in the clockwise direction by fingers, and insert the S slider assembly into the groove of the ST base.
12. Install the S rail to the chassis with four screws (PWH3×8).



Note 1 : Pay particular attention not to cause damage to the drum and the tape guide.

Note 2 : When installing the S rail, push the S rail in the direction of the arrors so that align the width of groove of the ST base and S rail.



13. After turning the motor rotation detection ring in the counterclockwise direction with fingers, and smear a molyton grease slighly to the part as shown in the figure.

Note 1 : Do not smear the grease to the rail.

Note 2 : Pay particular attention not to smear grease to the tape guide and drum, etc. when smearing grease. If it is smeared by mistake, wipe it off completely with a cleaning piece moistened with cleaning fluid.

14. Turn the motor rotation detection ring in the clockwise and counterclockwise directions by fingers, and make sure that the S slider assembly moves smoothly.

Adjustment after replacement

15. Perform tape running adjustment. (Refer to Section 6-3.)

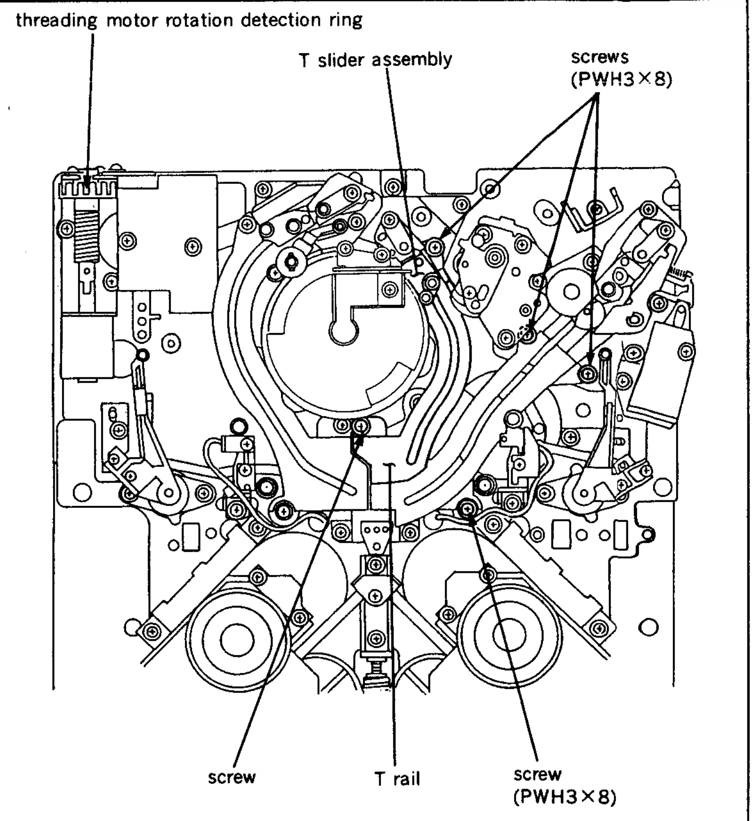
5-17. T SLIDER ASSEMBLY REPLACEMENT

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Molyton grease	: 7-662-001-41

Replacement flow chart

Removal of cleaning roller block
↓
Replacement of T slider assembly
↓
Installation of cleaning roller block
↓
Adjustment of cleaning roller block position
↓
Adjustment of tape running

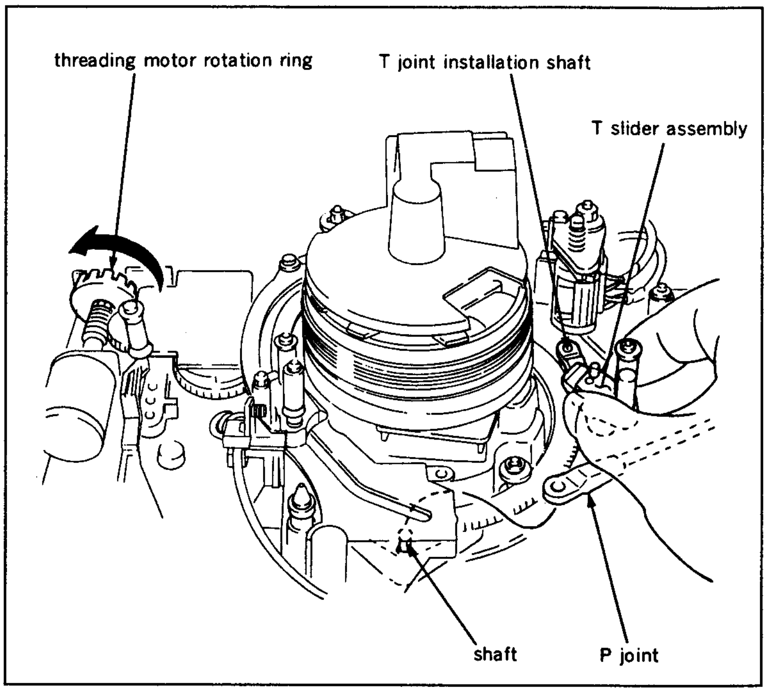


Removal

1. Remove a cleaning roller block. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. At this time, the harness clamper of the drum comes off together. (Refer to step (3) in Section 5-3.)
3. Rotate a drive gear by fingers so that a reel table is placed to the L cassette position.
4. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking it from the front, and put a T slider assmbly to 5 mm back from the threading completion mode.
   At this time S, T and P slider assemblies are moved on ST base and P base.
5. Unhook a tape beginning sensoe harness from a T rail.
6. Remove five screws (PWH3×10 and PWH3×8) that holds the T rail, and remove the T rail.

Note :Pay particular attention not to cause damage to a drum and tape guide during removal.

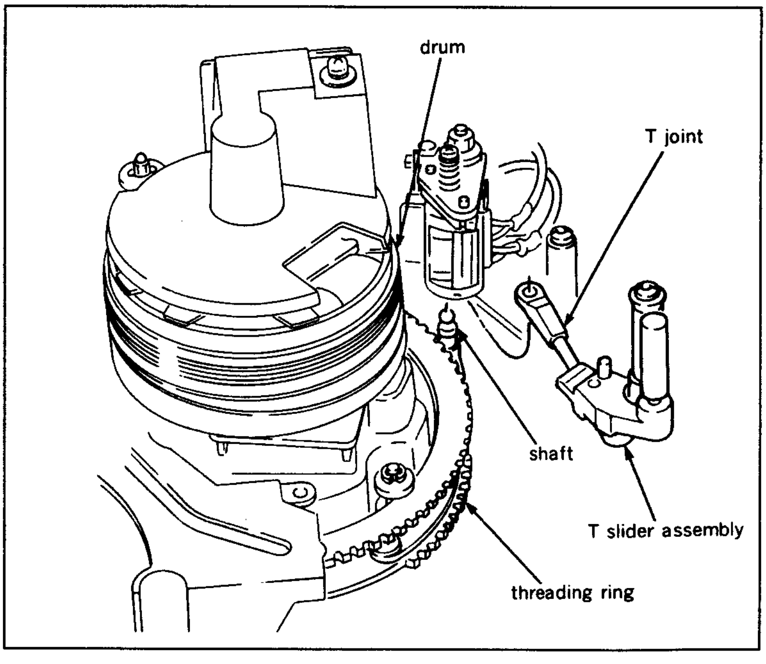
7. Remove the P joint which is connected with P slider assembly and threading ring from a shaft on the threading ring.
8. Hold the T slider assembly with hand and turn the motor rotation detection ring of the threading motor block in the counterclockwise direction by fingers until the T joint installation shaft on the threading ring comes to the position as shown in the figure.


threading motor rotation ring
T joint installation shaft
T slider assembly
shaft
P joint

9. Remove the T joint from the shaft on the threading ring, and remove the T slider assembly from the unit.

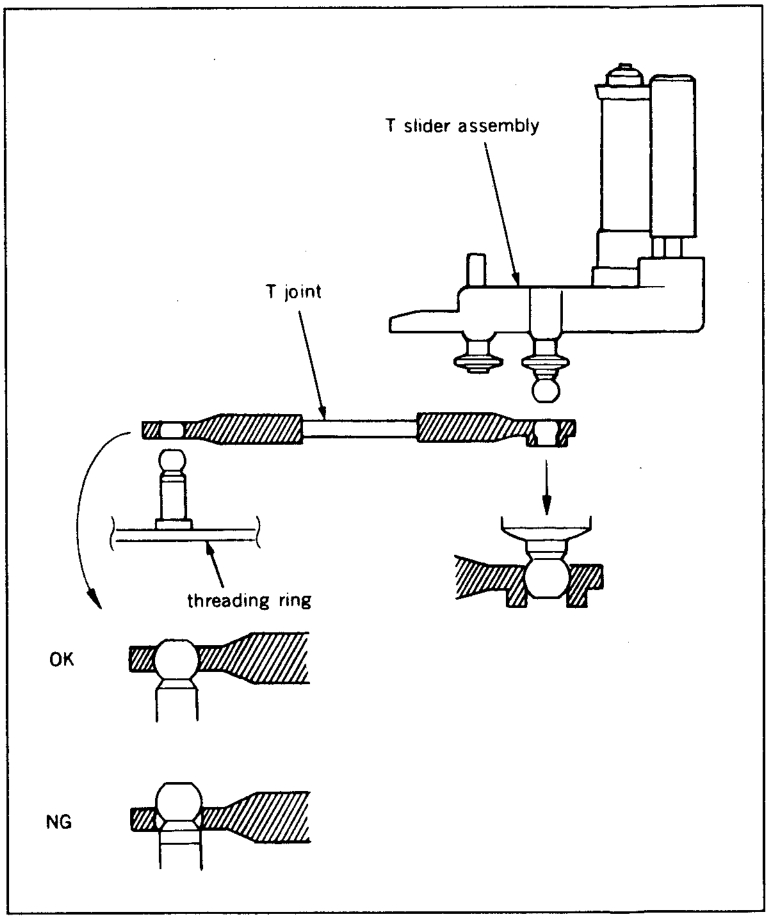
Note :Pay particular attention not to cause damage to the drum during removal.

10. Remove the T joint from the T slider assembly.

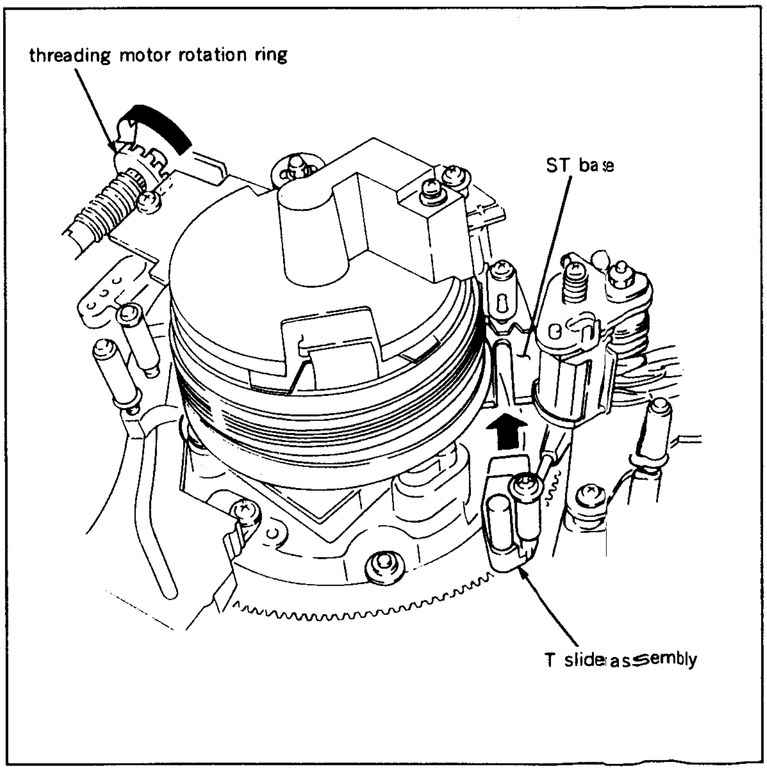

drum
T joint
shaft
T slider assembly
threading ring

Installation

11. Clean the contacting surfaces of the T rail with the T slider assembly with a cleaning piece moistened with cleaning fluid.
12. Clean the contacting surfaces of a new T slider assembly with the T rail with a cleaning piece moistened with cleaning fluid.
13. Insert the T joint to the T slider assembly as show in the figure.


T slider assembly
T joint
threading ring
OK
NG

14. Insert the other end of the T joint into a shaft on the threading ring.
15. Hold the T slider assembly with hand and turn the motor rotation detection ring of the threading motor block in the counterclockwise direction by fingers, and insert the T slider assembly into the groove of the ST base.
16. Insert the P joint into the shaft on the threading ring.

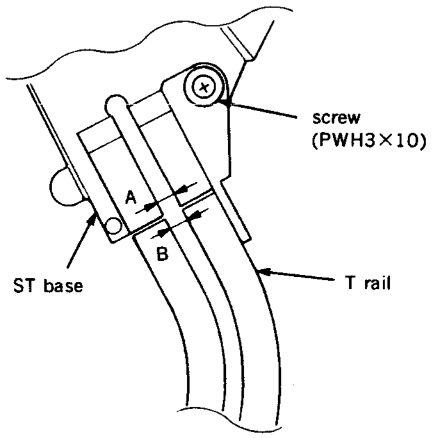

threading motor rotation ring
ST base
T slider assembly

17. Install the T rail to the chassis with five screws (PWH3×10 and PWH3×8).

Note 1 : Pay particular attention not to cause damage to the drum and the tape guide.

Note 2 : When installing the T rail, align the width of groove of the ST base and T rail, and at the same time align the width of groove of the P base and T rail.

Note 3 : When fastening the T rail with the screw (PWH3×8) shown in the figure, pay particular attention not to twist the T rail.

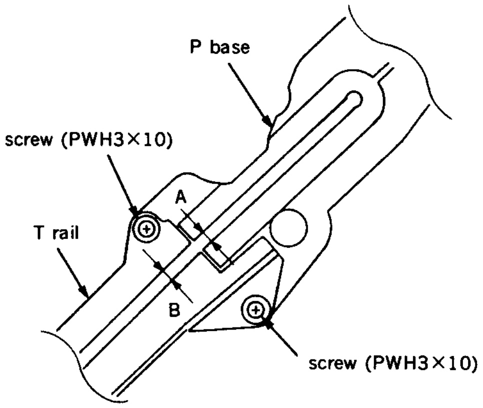


Spec.: A=B

18. After turning the motor rotation detection ring in the counterclockwise direction with fingers, and smear a molyton grease slighly to the part as shown in the figure.

Note 1 : Do not smear the grease to the rail.

Note 2 : Pay particular attention not to smear grease to the tape guide and drum, etc. when smearing grease. If it is smeared by mistake, wipe it off completely with a cleaning piece moistened with cleaning fluid.

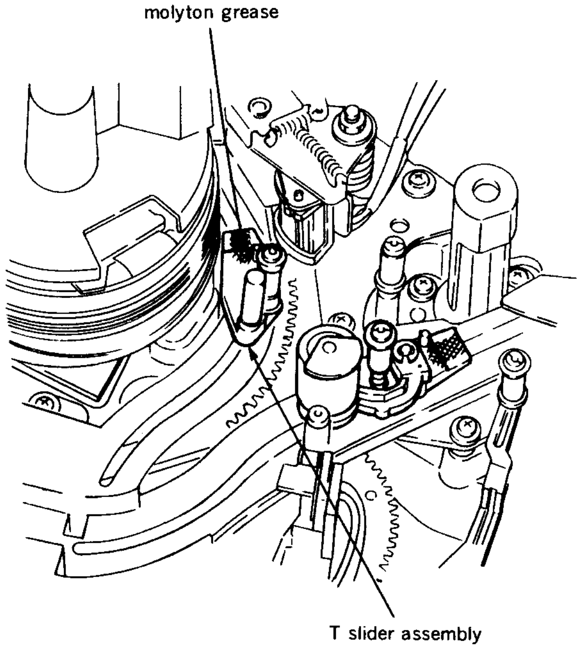


Spec.: A=B

19. Turn the motor rotation detection ring in the clockwise and counterclockwise directions by fingers, and make sure that the T slider assembly moves smoothly.
20. Install the AU head cover together with the drum harness clamper.
21. Install the cleaning roller block. (Refer to steps(7) and (8) in Section 5-6.)

Adjustment after replacement

22. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
23. Perform tape running adjustment. (Refer to Section 6-3.)



5-18. P SLIDER ASSEMBLY REPLACEMENT

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Molyton grease	: 7-662-001-41

Replacement flow chart

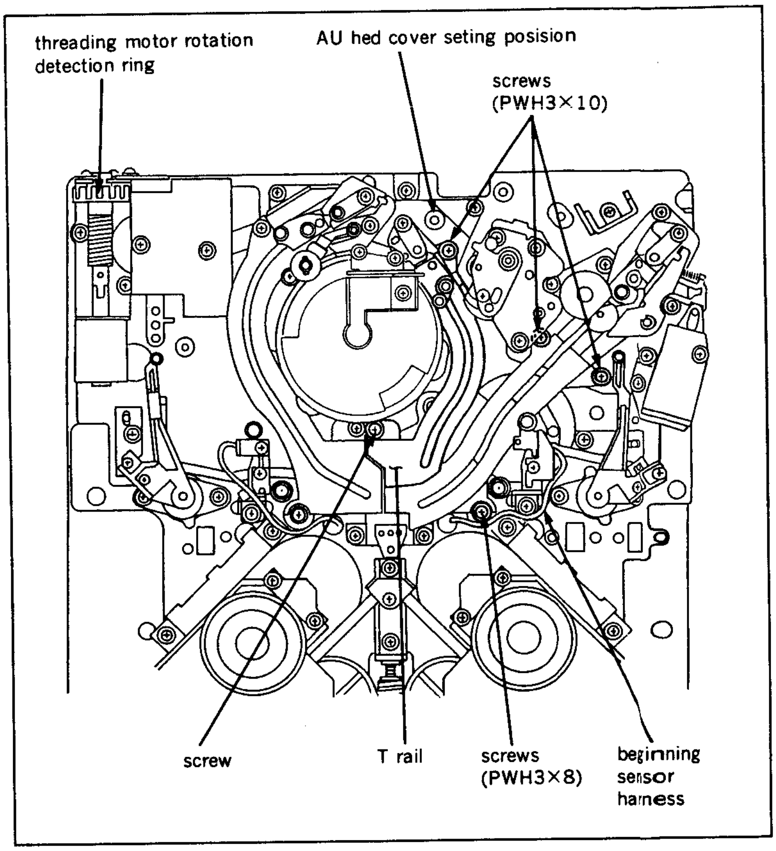
Replacement of P slider assembly

↓

Adjustment of cleaning roller block position

↓

Adjustment of tape running

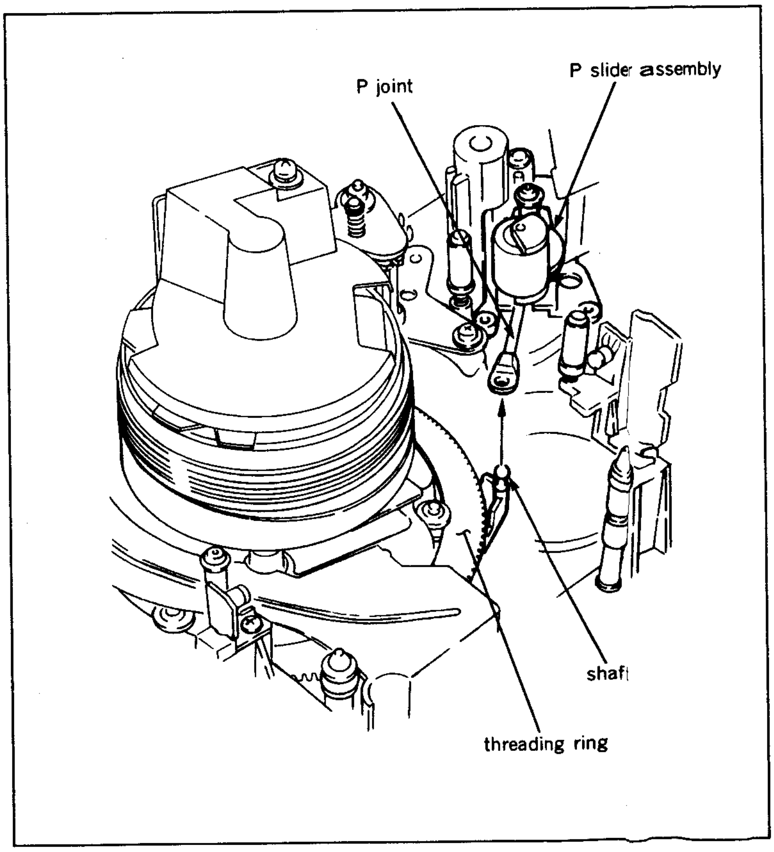

threading motor rotation detection ring
AU hed cover seting posision
screws (PWH3×10)
screw
T rail
screws (PWH3×8)
beginning sensor harness

Removal

1. Remove a cleaning roller block. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. At this time, the harness clamper of the drum comes off together. (Refer to step (3) in Section 5-3.)
3. Rotate a drive gear by fingers so that a reel table is placed to the L cassette position.
4. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking it from the front, and put a P slider assmbly to 5 mm back from the threading completion mode. At this time S, T and P slider assemblies are moved on ST base and P base.
5. Unhook the tape beginning sensor harness from the T rail.
6. Remove five screws (PWH3×10 and PWH3×8) that holds the T rail, and remove it.

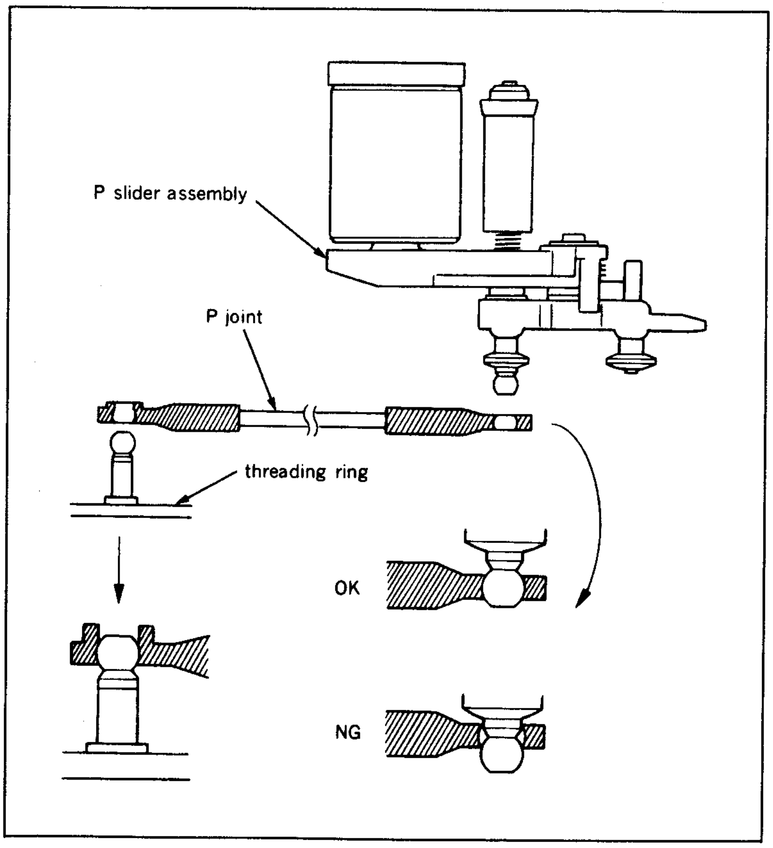
Note :Pay particular attention not to cause damage to a drum and tape guide during removal.

7. Remove a P joint which connects the P slider assembly with a threading ring from a shaft on the threading ring.
8. Remove the P joint from the P slider assembly.

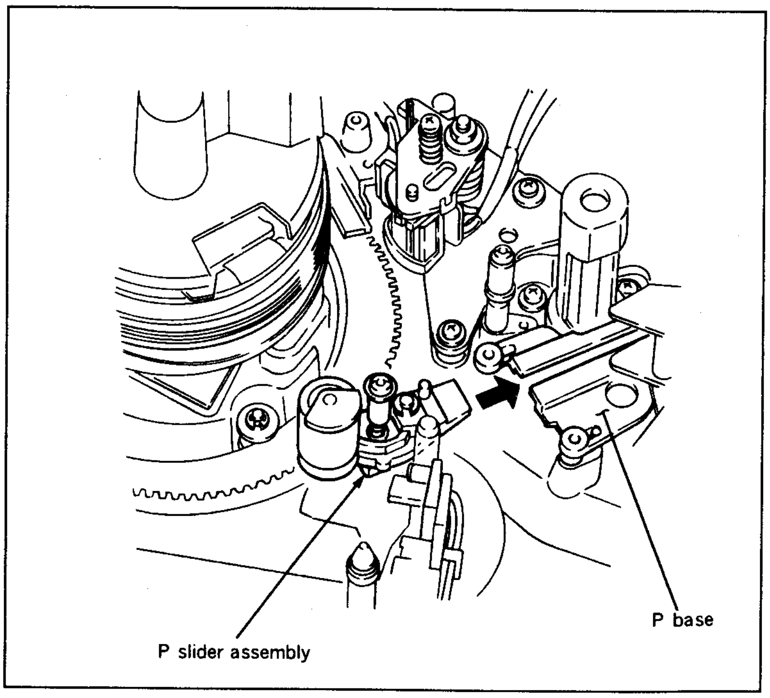

P joint
P slider assembly
shaft
threading ring

Installation

9. Clean the contacting surfaces of the T rail with the T slider assembly and P slider assembly with a cleaning piece moistened with cleaning fluid.
10. Clean the contacting surfaces of a new P slider assembly with the T rail with a cleaning piece moistened with cleaning fluid.
11. Insert the P joint to the P slider assembly as shown in the figure.


P slider assembly
P joint
threading ring
OK
NG

12. Insert the P slider assembly into the groove of the ST base as shown in the figure.

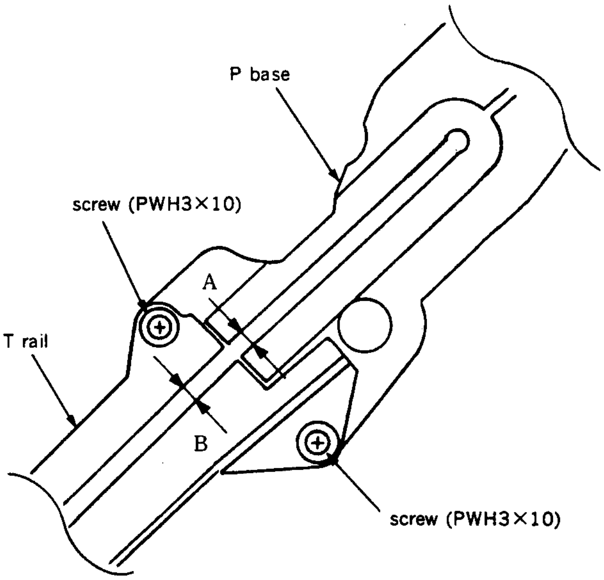

P base
P slider assembly

13. Insert the P joint into the shaft on the threading ring.
14. Install the T rail to the chassis with five screws (PWH3×10 and PWH3×8).

Note 1 : Pay particular attention not to cause damage to the drum and the tape guide.

Note 2 : When installing the T rail, align the width of groove of the ST base and T rail, and align the width of groove of P base and T rail.

Note 3 : When fastening the T rail with the screw (PWH3×10) shown in the figure, pay particular attention not to twist the T rail.

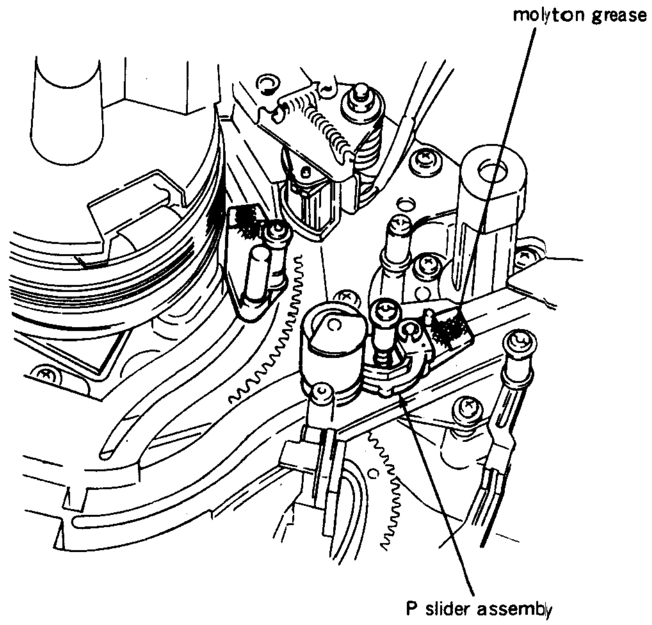


Spec.: A=B

15. After turning the motor rotation detection ring in the counterclockwise direction with fingers, and smear a molyton grease slighly to the part as shown in the figure.

Note 1 : Do not smear the grease to the rail.

Note 2 : Pay particular attention not to smear grease to the tape guide and drum, etc. when smearing grease. If it is smeared by mistake, wipe it off completely with a cleaning piece moistened with cleaning fluid.



16. Turn the motor rotation detection ring in the clockwise and counterclockwise directions by fingers, and make sure that the P slider assembly moves smoothly.
17. Install the AU head cover together with the drum harness clamper.
18. Install the cleaning roller block. (Refer to steps (7) and (8) in Section 5-6.)

Adjustment after replacement

19. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
20. Perform tape running adjustment. (Refer to Section 6-3.)

5-19. S TENSION REGULATOR ARM ASSEMBLY REPLACEMENT

Tool

L shaped wrench (across flat has 0.89 mm)
: 7-700-736-06

Replacement flow chart

Replacement of S tension regulator arm assembly

↓

Adjustment of S tension regulator arm operating position

↓

Adjustment of S tension regulator sensor sensitivity

(Be sure to replace a T tension regulator arm and TR-73 board which places under the T tension regulator arm at the back side of the chassis in this step, if necessary.)

Adjustment of FWD back tension

↓

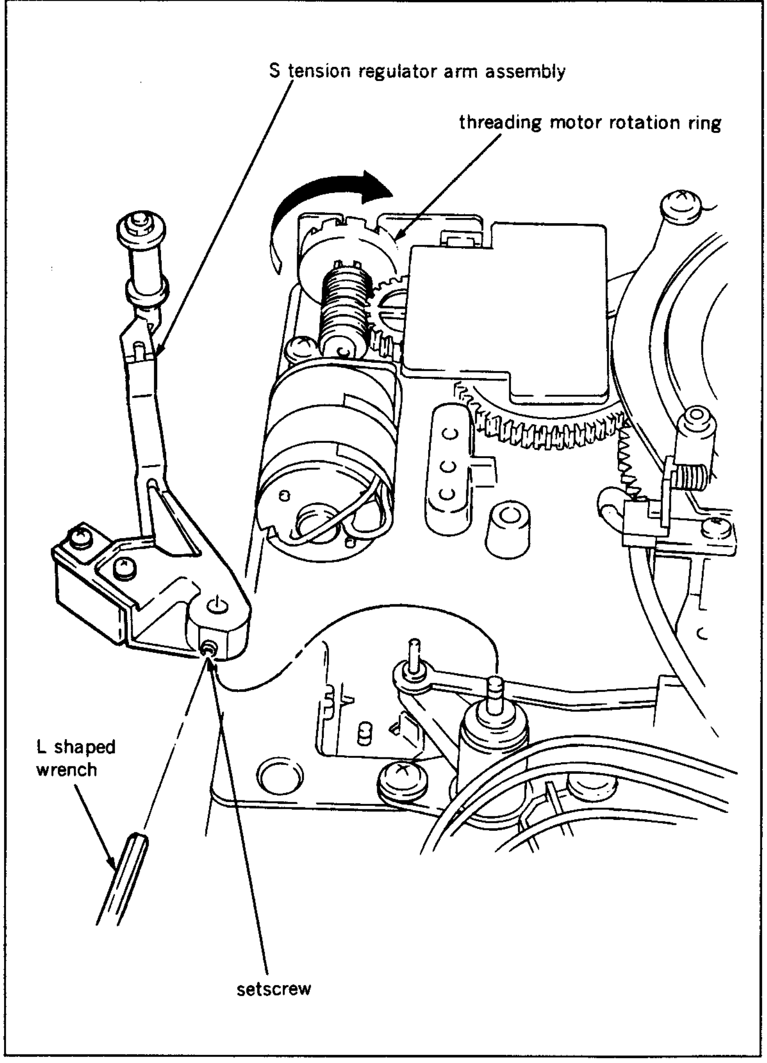
Adjustment of REV back tension

↓

Adjustment of tape running

↓

Confirmation of video tracking


S tension regulator arm assembly
threading motor rotation ring
L shaped wrench
setscrew

Removal

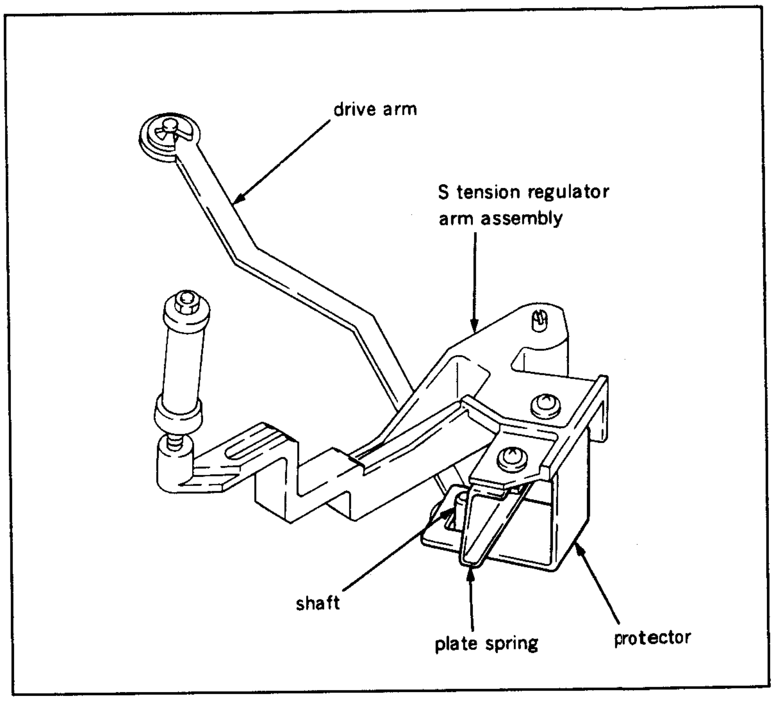
1. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking from the front, and put the unit into the threading completion mode.
2. Loosen a setscrew shown in the figure holding a S tension regulator arm assembly, and lift the S tension regulator arm assembly straight up to remove.

Installation

3. Install a new S tension regulator arm assembly to a shaft of a tension regulator base so that a protector, plate spring and shaft of a drive arm are assembled as shown in the figure, and tighten a setscrew.

Adjustment after replacement

4. Perform S tension regulator arm operating position adjustment. (Refer to step ⑿ and later in Section 5-19-1.)
5. Perform S tension sensor sensitivity adjustment. (Refer to Section 5-19-2.)
6. Perform FWD back tension adjustment. (Refer to Section 5-19-3.)
7. Perform REV back tension adjustment. (Refer to Section 5-19-4.)
8. Perform tape running adjustment. (Refer to Section 6-3.)
9. Perform confirmation of video tracking adjustment. (Refer to Section 6-4.)



5-19-1. S Tension Regulator Arm Operating Position Adjustment

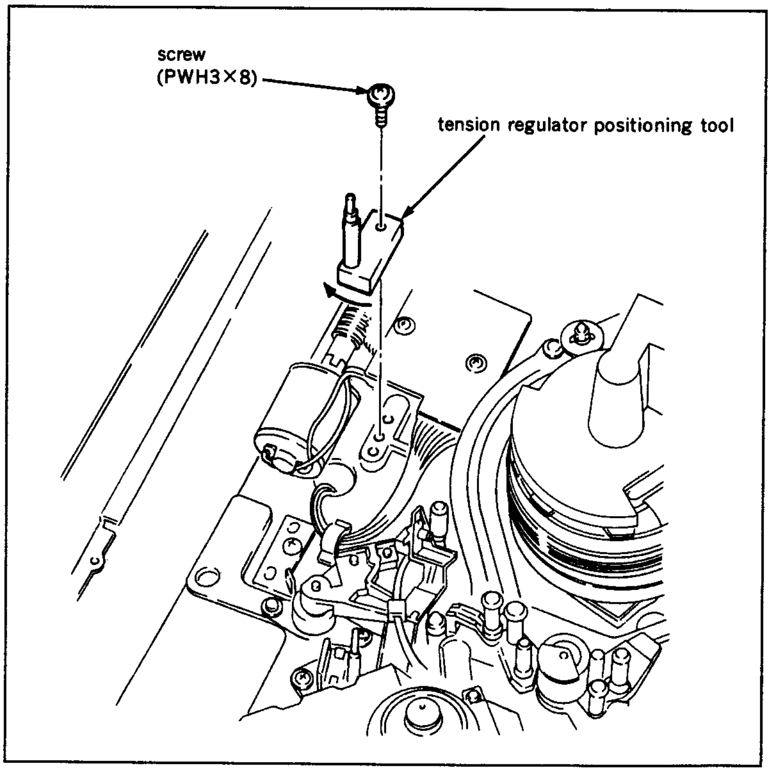
- Be sure to perform this adjustment without installing a cassette compartment.

Tools

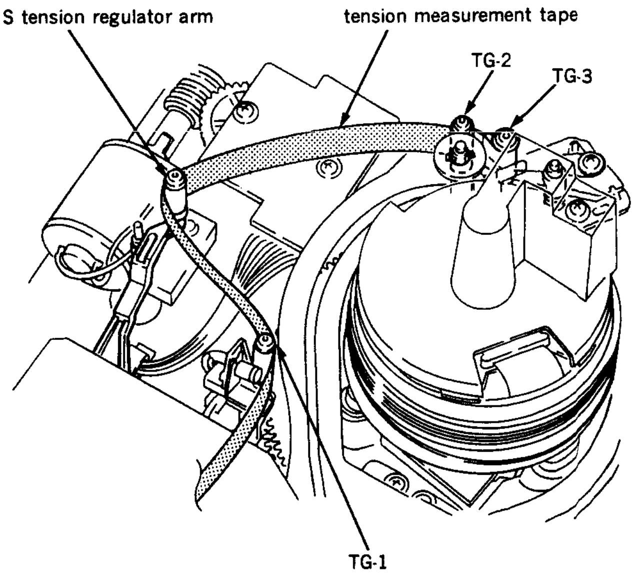
Cassette reference plate (L): J-6320-880-A
Tension regulator positioning tool : J-6322-370-A
Dial tension gauge (50g) : J-6327-850-A
Tension measurement tape : J-6327-930-A (Refer to Secrion 5-1.)
Nonslip rubber sheet : J-6327-980-A (Refer to Section 5-1.)
Wire clearance gauge : J-6152-450-A
Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

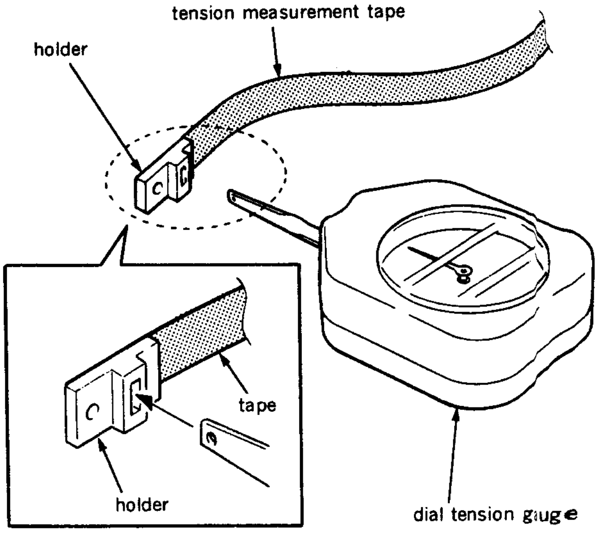
Check

1. Install a tension regulator positioning tool onto the place where the full erase head base was installed.
   While pressing the tool in the direction to the arrow, tighten it with screw (PWH3×8).



2. Put Bit4 of S601 on SS-48P board in CLOSE state.
3. Confirm that a reel table is in S cassette position. When it is in L cassette position, turn the POWER to ON once, change it to S cassette position, according to the Maintenance Menu "B027: REEL POSITION"
4. Place the cassette reference plate (L) on four cassette pillars.
5. Turn the POWER to ON. A threading ring rotates automatically, and put the unit into the threading completion mode. Press STANDBY button to be in STANDBY OFF mode, and stop the rotation of a drum.
6. Put one end of the tension measurement tape into TG-3 tape guide on a S slider assembly as shown in the figure.
7. Thread the tension measurement tape as shown in the figure.
8. Put the tip of the dial tension gauge into the holder of the tension measurement tape.

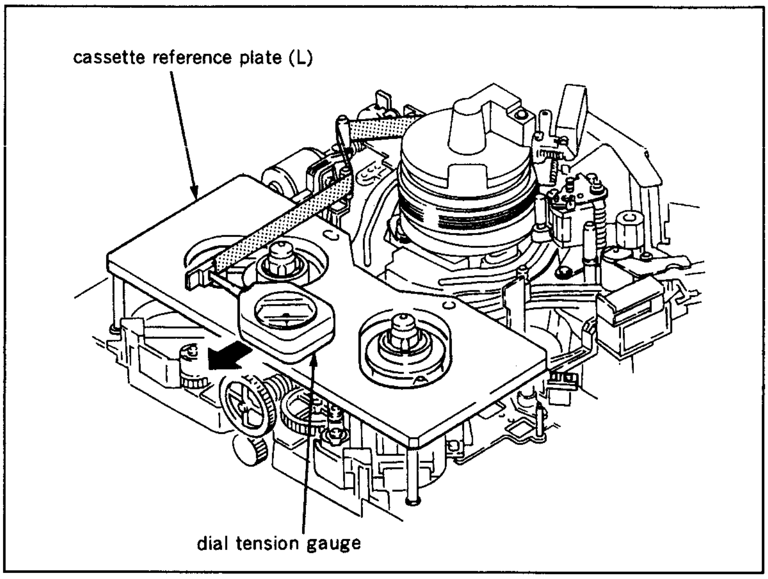

S tension regulator arm
tension measurement tape
TG-2
TG-3
TG-1


tension measurement tape
holder
tape
holder
dial tension gauge

9. Place the dial tension gauge on the cassette reference plate (L), and move the gauge along the cassette reference plate (L) in the direction shown in the figure until the indication of the gauge shows 42 g.

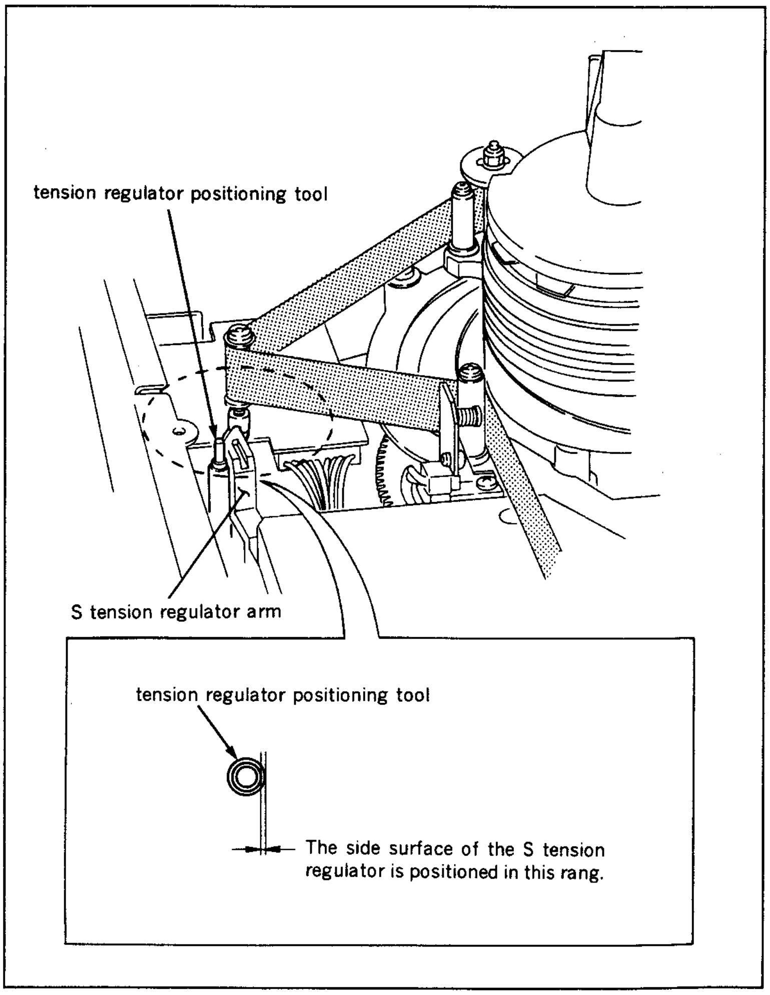
Note 1 :Confirm that the tension measurement tape is placed on every tape guide roller properly.

Note 2 :Pull the tension measurement tape in the parpendicular direction to the cassette reference plate (L).


cassette reference plate (L)
dial tension gauge

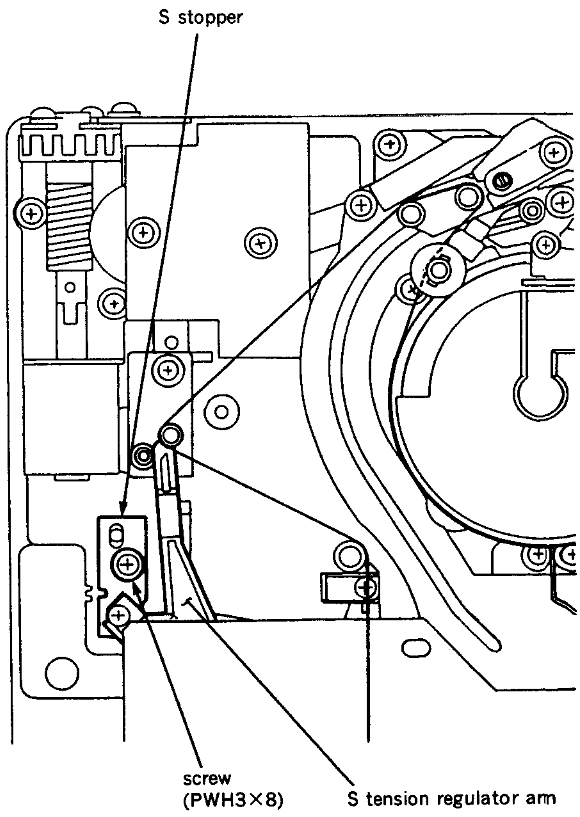
10. When the indication of the gauge is 42 g, confirm that the side surface of a S tension regulator arm is located within the limits of the tension regulator positioning tool as shown in the figure.

    If the specification is satisfied, perform step ⑯ and later.
    If the specification is not satisfied, perform step ⑪ and later.


tension regulator positioning tool
S tension regulator arm
tension regulator positioning tool
The side surface of the S tension regulator is positioned in this rang.

Adjustment

11. Loosen a fixing screw (PHW3×8) of a S stopper for 1/3 to 1/2 turn.
12. Perform step (9).
13. While keeping the state of step (9), insert a 3 mm flatblade screwdriver into notch of the S stopper, and adjust position of the S stopper so that the specification is satisfied.
14. Tighten the fixing screw (PWH3×8) of the S stopper.
15. Reconfirm that the specificatin is satisfied according to the check procedure.
16. After adjustment, take out the tension measurement tape from the unit, and press EJECT button to put into the unthreading completion mode, then take out the cassette reference plate (L).
17. Turn the POWER to OFF, and put Bit4 of S601 on SS-48P board in OPEN state.
18. Remove the tension regulator positioning tool.
19. Clean the tape running surfaces of TG-1, TG-2, TG-3 and tension regulator roller with a cleaning piece moistened with cleaning fluid.



5-19-2. S Tension Sensor Sensitivity Adjustment

- It is impossible to only confirm whether S tension sensor sensitivity is being properly adjusted. Be sure to adjust S tension sensor sensitivity as the following procedures below, and save the adjustment data in NOV RAM.
- Be sure to perform this adjustment after removing a cassette compartment.

Tools

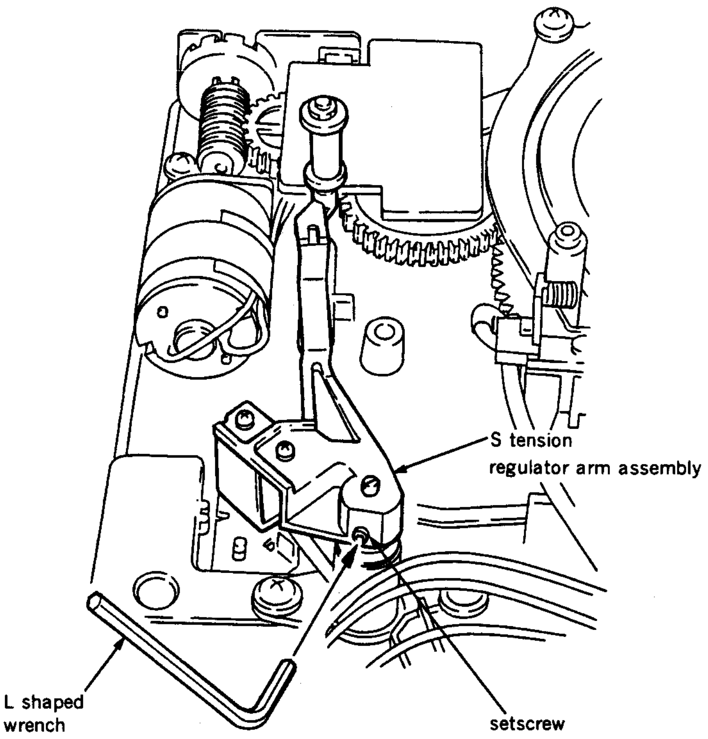
Cassette reference plate : J-6080-008-A
Dial tension gauge (50g) : J-6327-850-A
Tension measurement tape : J-6327-930-A
(Refer to Section 5-1.)
L shaped wrench (across flat has 0.89 mm)
: 7-700-736-06

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

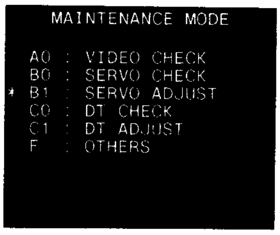
Adjustment

1. Turn the POWER to OFF, and put Bit4 of S601 on SS-48P board in CLOSE state.
2. Confirm that a reel table is in S cassette position. When it is in L cassette position, turn the POWER to ON once, change it to S cassette position, according to the Maintenance Menu "B027 : REEL POSITION"
3. Loosen a setscrew of a S tension regulator arm assembly for 1/4 to 1/3 turn.
4. Turn the POWER to ON. When the POWER is turned ON, threading automatically starts. Press EJECT button to put the unit in EJECT completion mode.
5. Push S302 and put the unit into maintenance mode.
6. Press the search dial to enter the jog mode, and move * mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
7. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
8. Move * mark to "B112: S TENSION SENSOR" which is displaying on the monitor screen with the search dial.
9. Press S302 on SS-48P board to execute "S TENSION SENSOR" menu.
10. Place a cassette reference plate on four cassette pillars.



S601-4/SS-48P : CLOSE

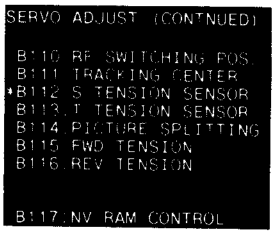
press S302



```
     MAINTENANCE MODE

  A0  :  VIDEO CHECK
  B0  :  SERVO CHECK
* B1  :  SERVO ADJUST
  C0  :  DT CHECK
  C1  :  DT ADJUST
  F   :  OTHERS
```

select with search dial

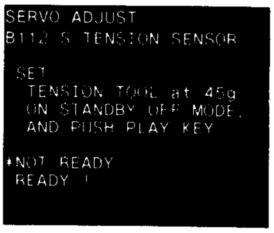
press S302



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS.
 B111 TRACKING CENTER
*B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


 B117:NV RAM CONTROL
```

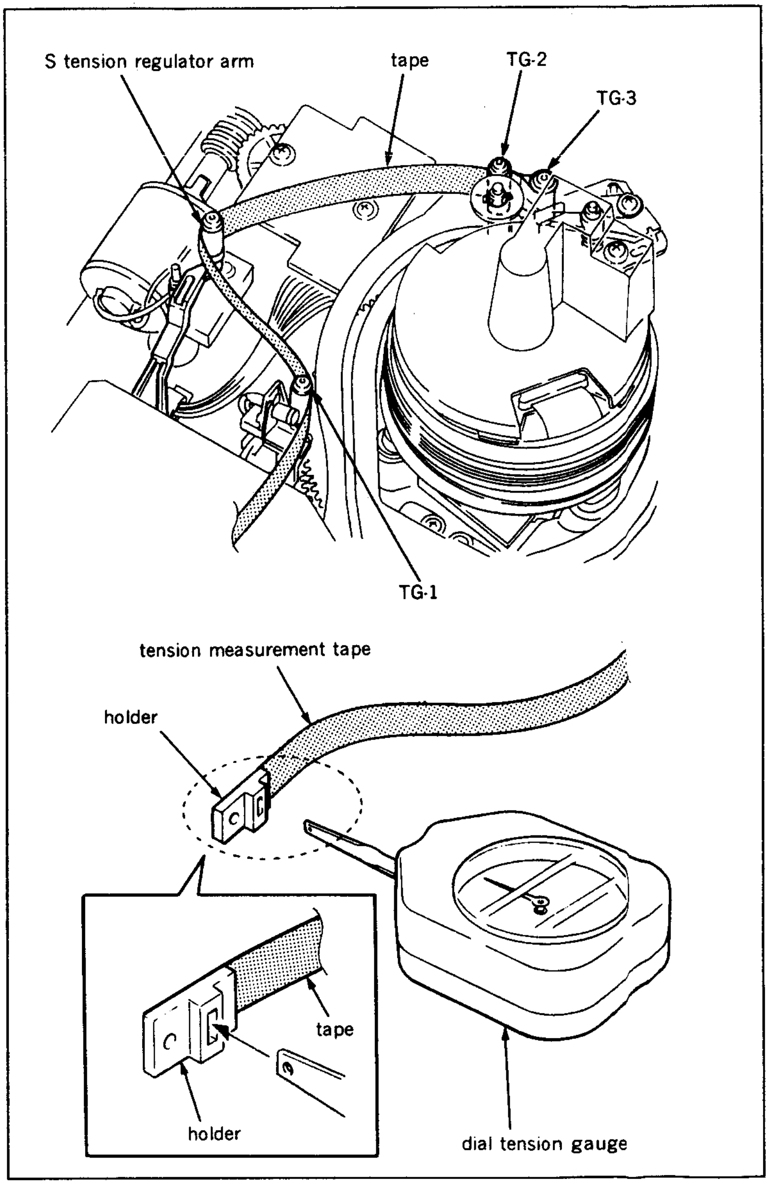
select with search dial

press S302



```
SERVO ADJUST
B112 S TENSION SENSOR

 SET
  TENSION TOOL at 45g
  ON STANDBY OFF MODE,
  AND PUSH PLAY KEY

*NOT READY
 READY !
```

11. Press STOP button to put the unit into the threading completion mode. Then press STANDBY button to be in STANDBY OFF mode, and stop the rotation of a drum.
12. Put one end of the tension measurement tape into TG-3 tape guide on a S slider assembly as shown in the figure.
13. Thread the special made tension measuring tape as shown in the figure.
14. Put the tip of the dial tension gauge into the holder of the special made tension measuring tape.

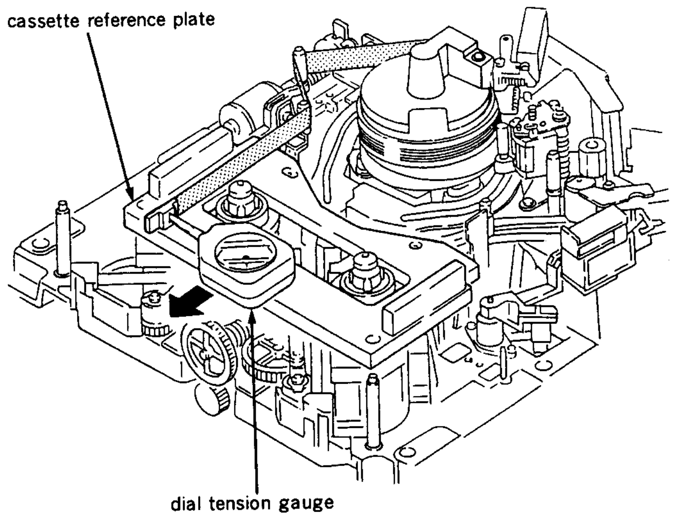

S tension regulator arm
tape
TG-2
TG-3
TG-1
tension measurement tape
holder
tape
holder
dial tension gauge

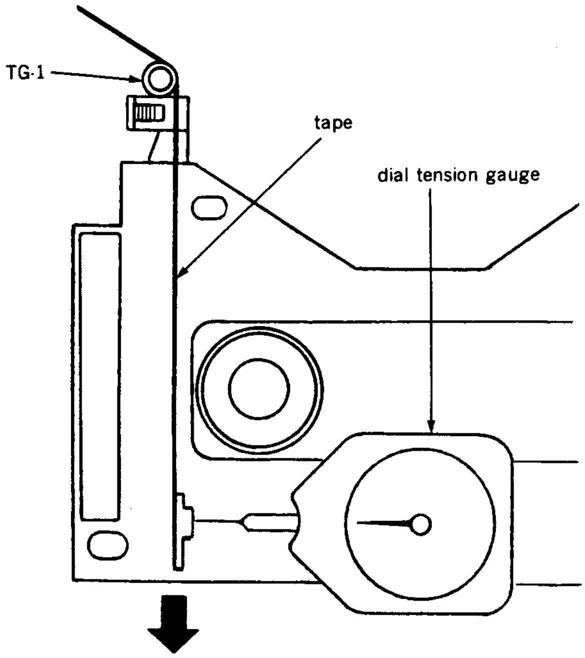
15. Place the dial tension gauge on the cassette reference plate, and move the gauge along the cassette reference plate in the direction shown in the figure until the indication of the gauge shows 45 g.

Note 1 : Confirm that the tension measurement tape is placed on every tape guide roller properly.

Note 2 : Pull the tension measurement tape in the parpendicular direction to the cassette reference plate.

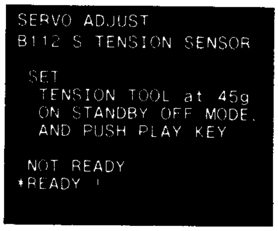
Note 3 : Keep the condition of step (15) when performing steps (16) through (20).





Pull the tape in the parpendicular direction to the cassette reference plate.

press PLAY button



```
SERVO ADJUST
B112 S TENSION SENSOR

 SET
  TENSION TOOL at 45g
  ON STANDBY OFF MODE.
  AND PUSH PLAY KEY

 NOT READY
*READY !
```

select with search dial

press S302

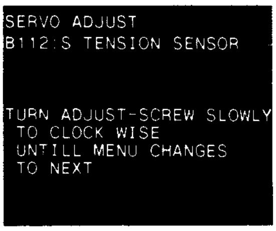
16. Press PLAY button.
17. Move * mark to "READY" which is displaying on the monitor screen with the search dial.
18. Press S302 on SS-48P board.
19. First, use a flatblade screwdriver to rotate the adjusting screw of the S tension regulator arm assembly clockwise slowly until the display on the monitor screen changes (turn three to four rotation).
    Then rotate the adjusting screw slowly until data displayed on the monitor screen changes to values between -10 and 10, and the data must be kept in increasing state.

Note 1 : Make sure to rotate the flatblade screwdriver clockwise.

Note 2 : While adjusting screw is rotated, the data will keep on increasing and decreasing. In this adjustment, the data must be kept in increasing state and adjusted to meet the specification.

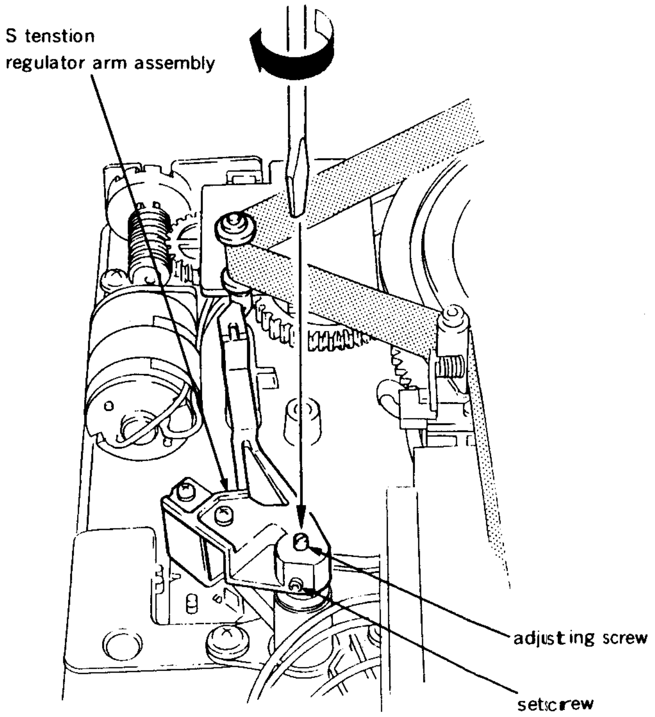
For example : 0001, 0002, 0003, 0004,... data shown in monitor screen is increasing.
0002, 0001, 0000, -0001,...data shown in monitor screen is decreasing.

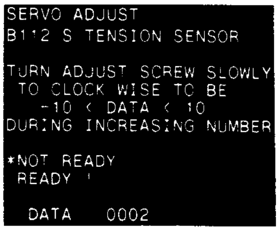
20. While the condition of step (15) is being kept, tighten a setscrew of the S tension regulator arm assembly.



```
SERVO ADJUST
B112:S TENSION SENSOR


TURN ADJUST-SCREW SLOWLY
 TO CLOCK WISE
 UNTILL MENU CHANGES
 TO NEXT
```

Turn adjusting screw clockwise direction





```
SERVO ADJUST
B112 S TENSION SENSOR

TURN ADJUST SCREW SLOWLY
 TO CLOCK WISE TO BE
   -10 < DATA < 10
DURING INCREASING NUMBER

*NOT READY
 READY

  DATA    0002
```

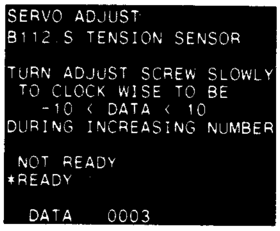
Rotate the adjusting screw until data displayed changes to value between −10 and 10, (must be kept in increasing state).

tighten a setscrew

21. Move * mark to "READY" which is displaying on the monitor screen with the search dial.
22. Press S302 on SS-48P board.
23. After pressing STOP button, press STANDBY button to be in STANDBY OFF mode, and stop the rotation of a drum.
24. Place the dial tension gauge on the cassette reference plate, and move the gauge along the cassette reference plate in the direction shown in the figure until the indication of the gauge shows 25 g.

Note 1 : Confirm that the tension measurement tape is placed on every tape guide roller properly.
Note 2 : Pull the tension measurement tape in the parpendicular direction to the cassette reference plate.
Note 3 : Keep the condition of step (24) when performing steps ㉕ through ㉗.

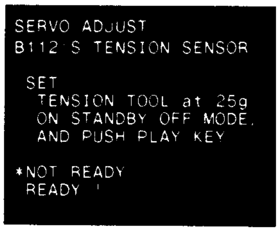
25. Press PLAY button.
26. Move * mark to "READY" which is displaying on the monitor screen with the search dial.
27. Press S302 on SS-48P board.
28. After pressing STOP button, press STANDBY button to be in STANDBY OFF mode, and stop the rotation of a drum.
29. Take out the dial tension gauge, tension measurement tape and cassette reference plate from the unit.
30. Press EJECT button to put into the unthreading completion mode.



```
SERVO ADJUST
B112 S TENSION SENSOR

TURN ADJUST SCREW SLOWLY
 TO CLOCK WISE TO BE
   -10 < DATA < 10
DURING INCREASING NUMBER

 NOT READY
*READY

 DATA    0003
```

select with search dial

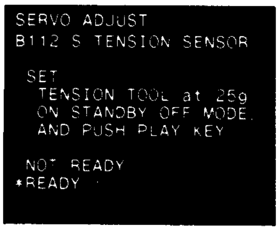
press S302



```
SERVO ADJUST
B112 S TENSION SENSOR

 SET
  TENSION TOOL at 25g
  ON STANDBY OFF MODE.
  AND PUSH PLAY KEY

*NOT READY
 READY
```

Indication of the gauge shows 25 g.

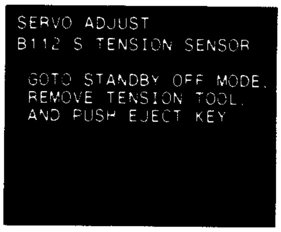
press PLAY button



```
SERVO ADJUST
B112 S TENSION SENSOR

 SET
  TENSION TOOL at 25g
  ON STANDBY OFF MODE.
  AND PUSH PLAY KEY

 NOT READY
*READY
```

select with search dial

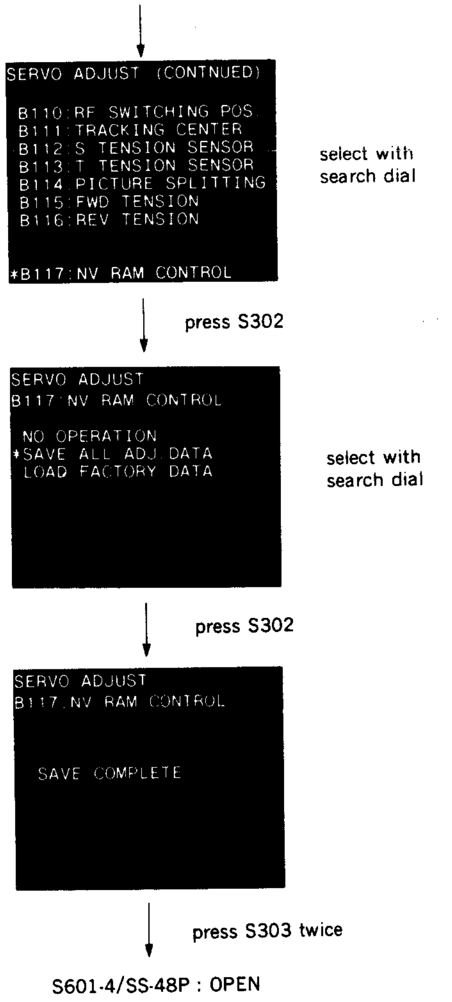
press S302



```
SERVO ADJUST
B112 S TENSION SENSOR

 GOTO STANDBY OFF MODE.
 REMOVE TENSION TOOL.
 AND PUSH EJECT KEY
```

Take out the dial tension gauge, tension measurement tape, and cassette reference plate. Press EJECT button.

31. Move * mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
32. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
33. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
34. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
35. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.
36. Turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


*B117:NV RAM CONTROL
```

select with search dial

press S302

```
SERVO ADJUST
B117:NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302

```
SERVO ADJUST
B117:NV RAM CONTROL


  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-19-3. FWD Back Tension Adjustment

- Make sure to perform this adjustment with a cassette compartment is installed.

Tools

Cassette tape BCT-30M

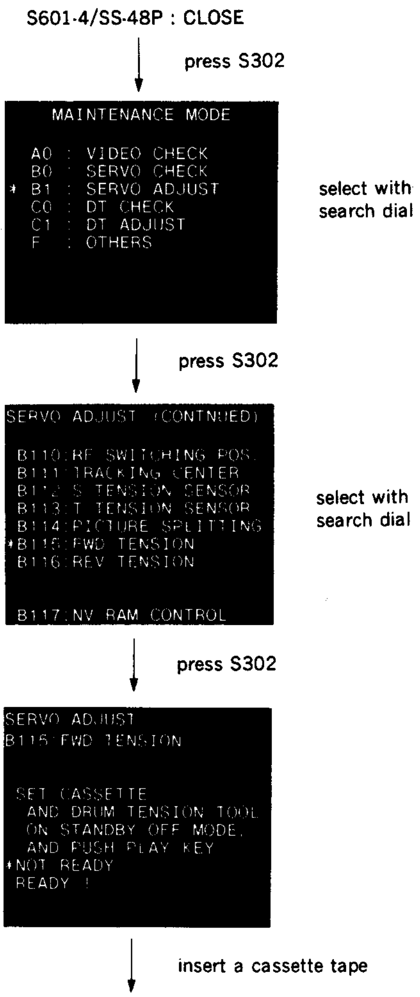
Drum tension tool (Recommended to use TENTELOMETER U2-H7-UMC).

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Put the unit into EJECT mode.
2. Turn the POWER to OFF, and put Bit4 of S601 on SS-48P board in CLOSE state.
3. Turn the POWER to ON. Push S302 on SS-48P board and put the unit into maintenance mode.
4. Press the search dial to enter the jog mode, and move ∗ mark to "B1 : SERVO ADJUST" which is displaying on the monitor screen with the search dial.
5. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
6. Move ∗ mark to "B115: FWD TENSION" which is displaying on the monitor screen with the search dial.
7. Press S302 on SS-48P board to execute "FWD TENSION" menu.
8. Insert a BCT-30M cassette tape at about 3 minutes portion from the tape beginning.



S601-4/SS-48P : CLOSE

press S302

```
   MAINTENANCE MODE

 A0  :  VIDEO CHECK
 B0  :  SERVO CHECK
*B1  :  SERVO ADJUST
 C0  :  DT CHECK
 C1  :  DT ADJUST
 F   :  OTHERS
```

select with search dial

press S302

```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
*B115:FWD TENSION
 B116:REV TENSION


 B117:NV RAM CONTROL
```

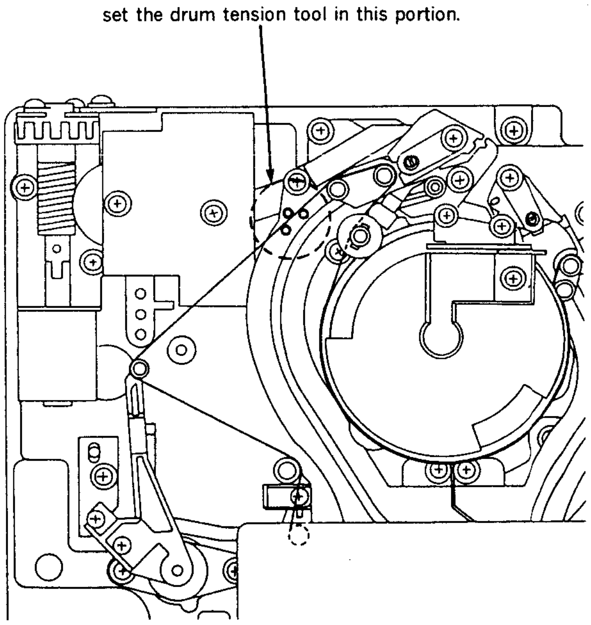
select with search dial

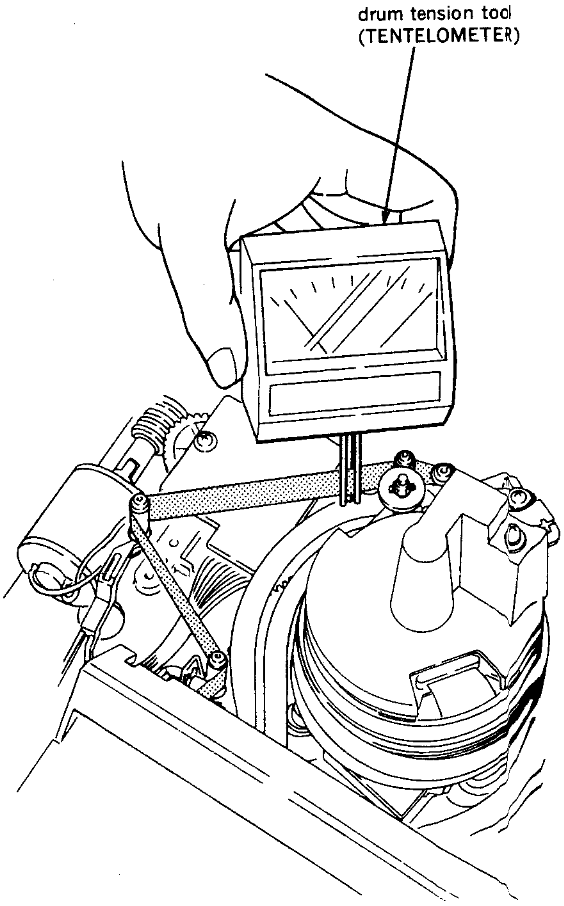
press S302

```
SERVO ADJUST
B115:FWD TENSION


 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE,
  AND PUSH PLAY KEY
*NOT READY
 READY !
```

insert a cassette tape

9. Hold a drum tension tool (TENTELOMETER), and insert it into the appointed portion as shown in the figure.


set the drum tension tool in this portion.


drum tension tool
(TENTELOMETER)

10. Put the unit into Play mode.

Note : Adjust the slantness of the drum tension tool so that the tape runs smoothly without waveing between the S tension regulator arm and full erase head, and between the full erase head and TG-2 tape guide.

11. Move ∗ mark to "READY" which is displaying on the monitor screen with the search dial.
12. Confirm that the values of the drum tension tool meet the specification.

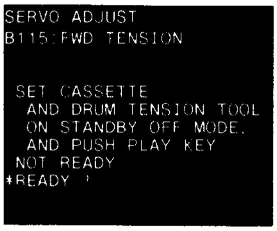
Specification : 41g to 45g.

If not to meet the specification, parform step (13) and later.

Adjustment

13. Parform steps from (1) to (11).
14. Press S302 on SS-48P board.
15. Rotate search dial until the value of drum tension tool meets the specification.
16. If meet the specification, push S302 on SS-48P board.
17. When the FWD back tension adjustment is finished and does not perform the REV back tension adjustment continuously, press S302 on SS-48P board, and perform steps (18) and later.
    If the REV back tension adjustment performs after the FWD back tension adjustment continuously, move ∗ mark to "ADJUST REV TENSION" which is displaying on the monitor screen with the search dial, and then press S302.
    After this operation, perform the REV back tension adjustment in accordance with Section 5-19-4.
    (The adjustment data of FWD back tension adjustment and REV back tension adjustment stores together in the NOV RAM.)
18. Remove drum tension tool and then push EJECT button, take out the cassette tape.
19. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
20. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.

press PLAY button



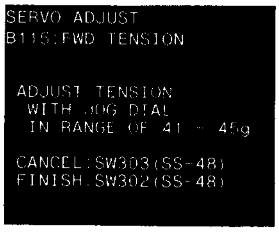
```
SERVO ADJUST
B115:FWD TENSION

 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE.
  AND PUSH PLAY KEY
 NOT READY
*READY
```

select with search dial

Confirm the value meets the specification.

if NG

press S302



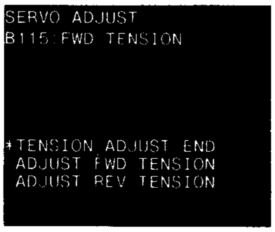
```
SERVO ADJUST
B115:FWD TENSION

 ADJUST TENSION
  WITH JOG DIAL
  IN RANGE OF 41 - 45g

 CANCEL:SW303(SS-48)
 FINISH.SW302(SS-48)
```

Rotate search dial until the value meets the specification.

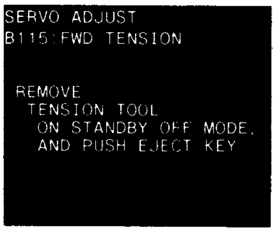
press S302

When finished, press S302

When performing REV back tension adjustment, move ∗ mark to "ADJUST REV TENSION", and press S302.



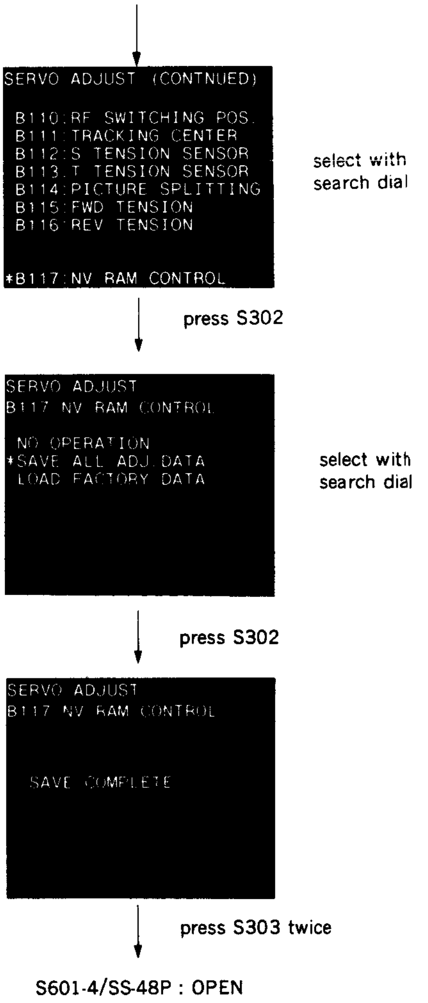
```
SERVO ADJUST
B115:FWD TENSION



*TENSION ADJUST END
 ADJUST FWD TENSION
 ADJUST REV TENSION
```



```
SERVO ADJUST
B115:FWD TENSION

 REMOVE
  TENSION TOOL
   ON STANDBY OFF MODE.
   AND PUSH EJECT KEY
```

press EJECT button

21. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
22. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
23. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.
24. Turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


*B117:NV RAM CONTROL
```

select with search dial

press S302

```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302

```
SERVO ADJUST
B117 NV RAM CONTROL


  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-19-4. REV Back Tension Adjustment

- Make sure to perform this adjustment with a cassette compartment is installed.

Tools

Cassette tape BCT-30M

Drum tension tool (Recommended to use TENTELOMETER U2-H7-UMC).

Preparation

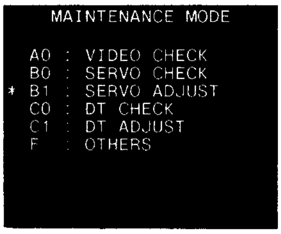
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Put the unit into EJECT mode.
2. Turn the POWER to OFF, and put Bit4 of S601 on SS-48P board in CLOSE state.
3. Turn the POWER to ON. Push S302 on SS-48P board and put the unit into maintenance mode.
4. Press the search dial to enter the jog mode, and move ∗ mark to "B1 : SERVO ADJUST" which is displaying on the monitor screen with the search dial.
5. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
6. Move ∗ mark to "B116: REV TENSION" which is displaying on the monitor screen with the search dial.
7. Press S302 on SS-48P board to execute "REV TENSION" menu.
8. Insert a BCT-30M cassette tape at about 3 minutes portion from the tape beginning.
9. Hold a drum tension tool, and insert it into the appointed portion as shown in the figure.

S601-4/SS-48P : CLOSE

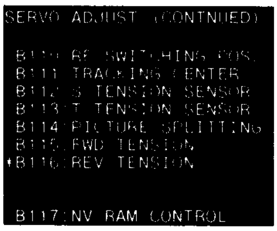
↓ press S302



```
      MAINTENANCE MODE

   A0 : VIDEO CHECK
   B0 : SERVO CHECK
 * B1 : SERVO ADJUST
   C0 : DT CHECK
   C1 : DT ADJUST
   F  : OTHERS
```

select with search dial

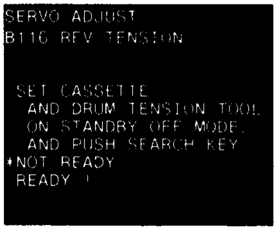
↓ press S302



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
*B116:REV TENSION


 B117:NV RAM CONTROL
```

select with search dial

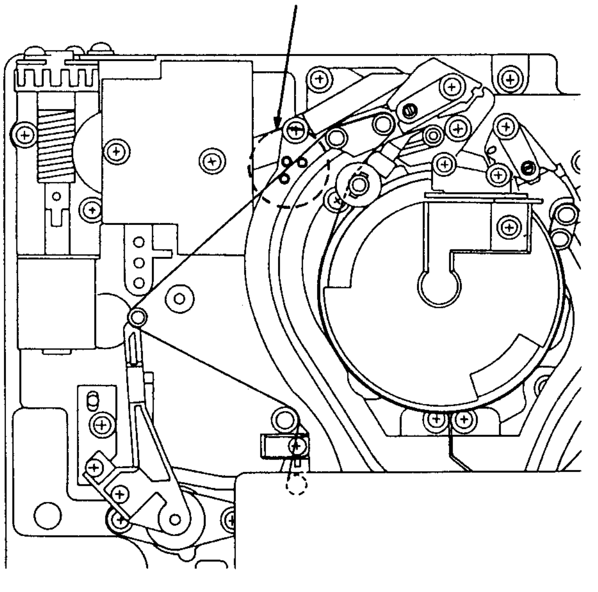
↓ press S302



```
SERVO ADJUST
B116 REV TENSION


 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE.
  AND PUSH SEARCH KEY
*NOT READY
 READY !
```

↓ insert a cassette tape

set the drum tension tool in this portion.



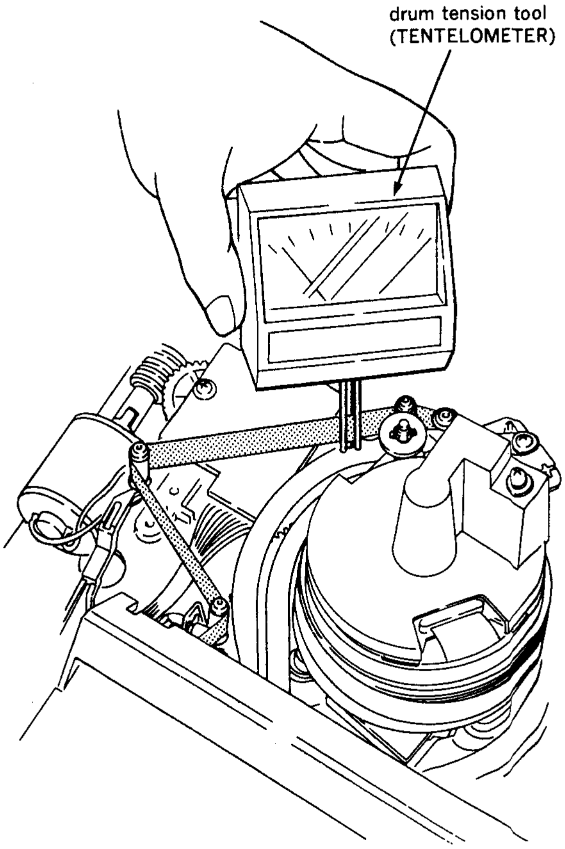
10. Press SEARCH button.

Note : Adjust the slantness of the drum tension tool so that the tape is placed without twistng between the S tension regulator arm and TG-2 tape guide.

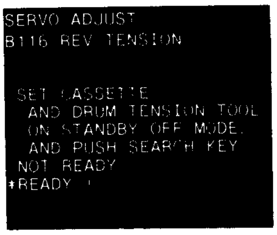
11. Move ∗ mark to "READY" which is displaying on the monitor screen with the search dial.
12. Confirm that the values of the drum tension tool satisfiy the specification.

Specification : 28 g to 34 g.

If the specificationis not satisfied, parform step ⒀ and later.



press SEARCH button



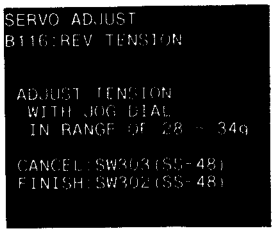
```
SERVO ADJUST
B116 REV TENSION

 SET CASSETTE
  AND DRUM TENSION TOOL
  ON STANDBY OFF MODE.
  AND PUSH SEARCH KEY
 NOT READY
*READY
```

select with search dial

Confirm the value meets the specification.

if NG

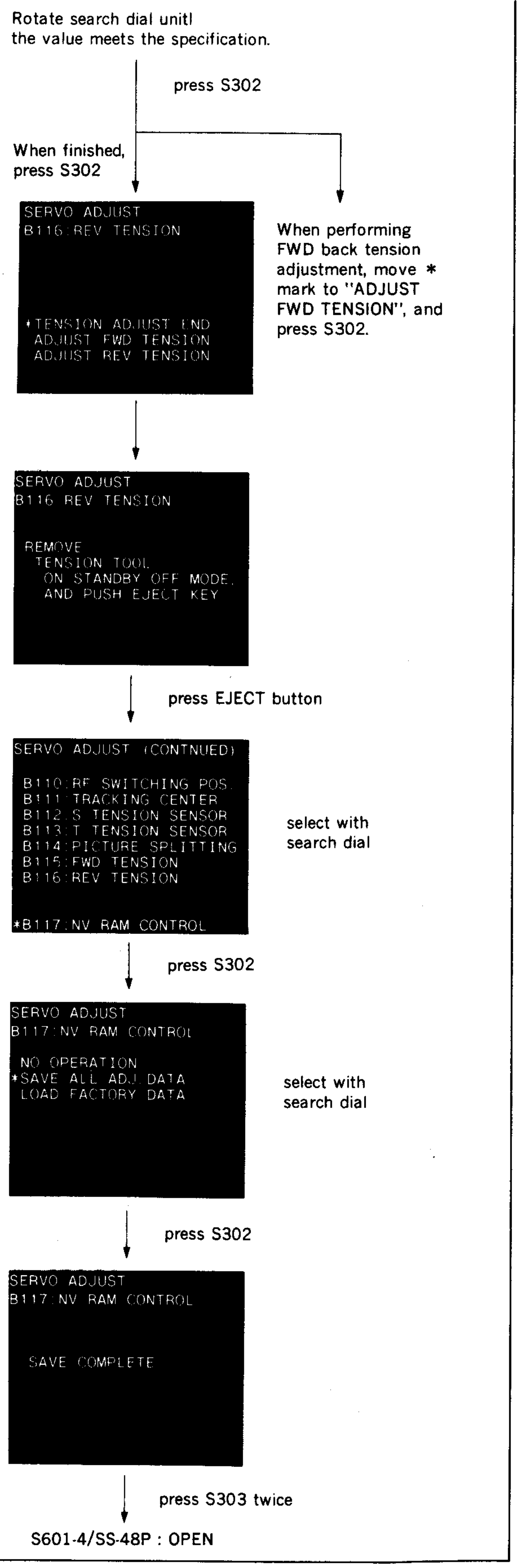
press S302



```
SERVO ADJUST
B116:REV TENSION

 ADJUST TENSION
  WITH JOG DIAL
  IN RANGE OF 28 - 34g

 CANCEL:SW303(SS-48)
 FINISH:SW302(SS-48)
```

Adjustment

13. Parform steps from (1) to ⑪.
14. Press S302 on SS-48P board.
15. Rotate search dial until the value of drum tension tool satisfies the specification.
16. If the specificationis is satisfied, press S302 on SS-48P board.
17. When the REV back tension adjustment is finished and does not perform the FWD back tension adjustment continuously, press S302 on SS-48P board, and perform steps ⑱ and later.
    If the FWD back tension adjustment performs after the REV back tension adjustment continuously, move ∗ mark to "ADJUST FWD TENSION" which is displaying on the monitor screen with the search dial, and then press S302.
    After this operation, perform the FWD back tension adjustment in accordance with Section 5-19-3.
    (The adjustment data of REV back tension adjustment and FWD back tension adjustment stores together in the NOV RAM.)
18. Remove drum tension tool and then press EJECT button, take out the cassette tape.
19. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
20. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
21. Move ∗ mark to "SAVE ALL ADJ. DATA" with the search dial.
22. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
23. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.
24. Turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.


Rotate search dial unitl the value meets the specification.
press S302
When finished, press S302
When performing FWD back tension adjustment, move ∗ mark to "ADJUST FWD TENSION", and press S302.
press EJECT button
select with search dial
press S302
select with search dial
press S302
press S303 twice
S601-4/SS-48P : OPEN

```
SERVO ADJUST
B116:REV TENSION

*TENSION ADJUST END
 ADJUST FWD TENSION
 ADJUST REV TENSION
```

```
SERVO ADJUST
B116 REV TENSION

REMOVE
 TENSION TOOL
  ON STANDBY OFF MODE,
  AND PUSH EJECT KEY
```

```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION

*B117:NV RAM CONTROL
```

```
SERVO ADJUST
B117:NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

```
SERVO ADJUST
B117 NV RAM CONTROL

 SAVE COMPLETE
```

5-20. T TENSION REGULATOR ARM ASSEMBLY REPLACEMENT

Tool

L shaped wrench (across flat has 0.89 mm)
: 7-700-736-06

Replacement flow chart

Replacement of T tension regulator arm assembly

↓

Adjustment of T tension regulator arm operating position

↓

Adjustment of T tension sensor sensitivity

(Be sure to replace a S tension regulator arm and TR-73 board which places under the S tension regulator arm at the back side of the chassis in this step, if necessary.)

Adjustment of FWD back tension

↓

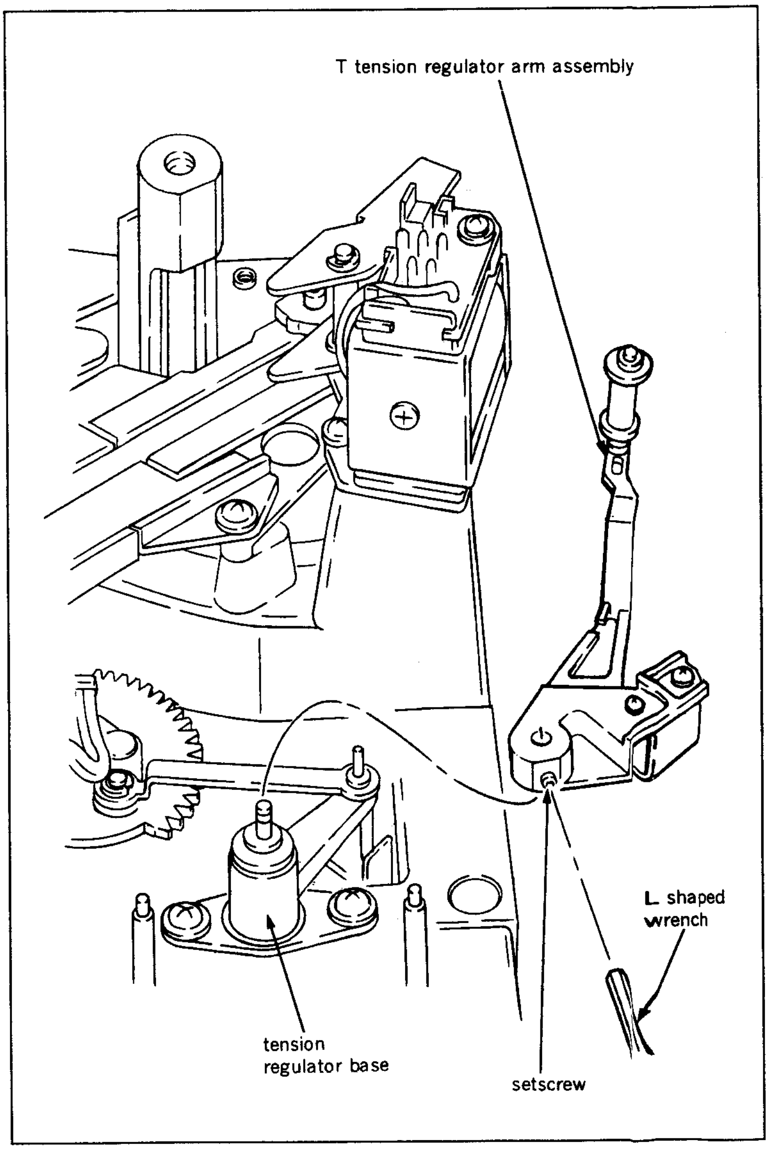
Adjustment of REV back tension

↓

Adjustment of tape running

↓

Confirmation of video tracking

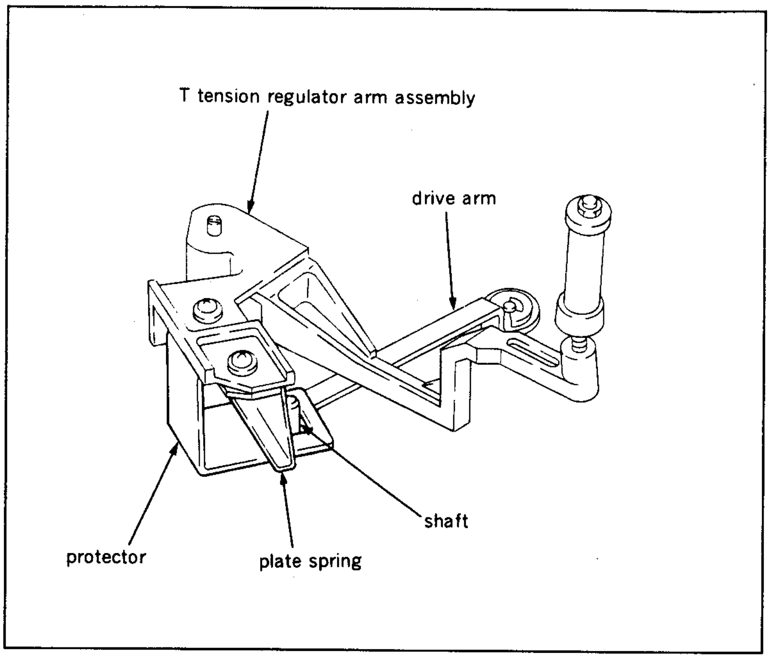


Removal

1. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking from thr front, and put the unit into the threading completion mode.
2. Loosen a setscrew shown in the figure holding a T tension regulator arm assembly, and lift the T tension regulator arm assembly straight up to remove.

Installation

3. Install a new T tension regulator arm assembly to a shaft of a tension regulator base so that a protector, plate spring and shaft of a drive arm are assembled as shown in the figure, and tighten a setscrew.



Adjustment after replacement

4. Perform T tension regulator arm operating position adjustment. (Refer to step ⑽ and later in Section 5-20-1.)
5. Perform T tension sensor sensitivity adjustment. (Refer to Section 5-20-2.)
6. Perform FWD back tension adjustment. (Refer to Section 5-19-3.)
7. Perform REV back tension adjustment. (Refer to Section 5-19-4.)
8. Perform tape running adjustment. (Refer to Section 6-3.)
9. Perform confirmation of video tracking. (Refer to Section 6-4.)

5-20-1. T Tension Regulator Arm Operating Position Adjustment

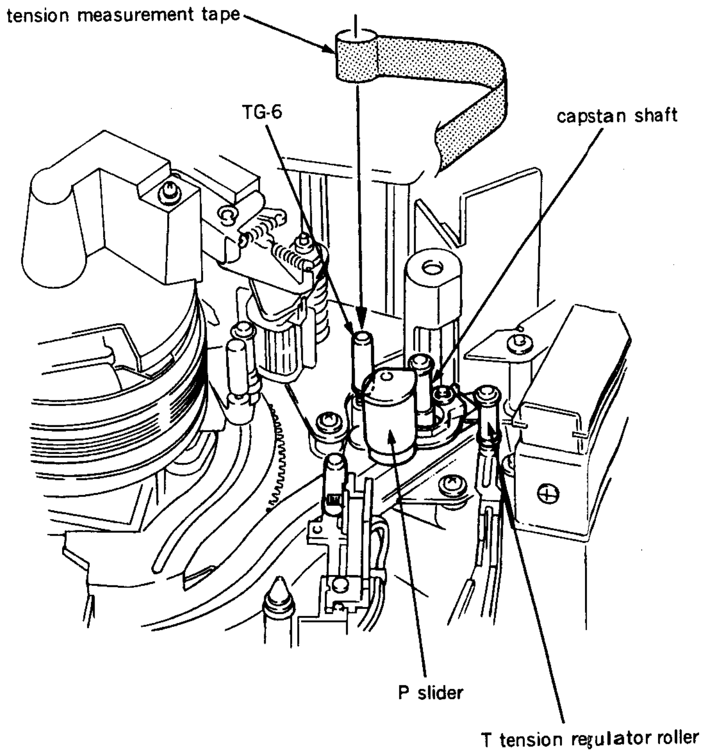
- Be sure to perform this adjustment without installing a cassette compartment.

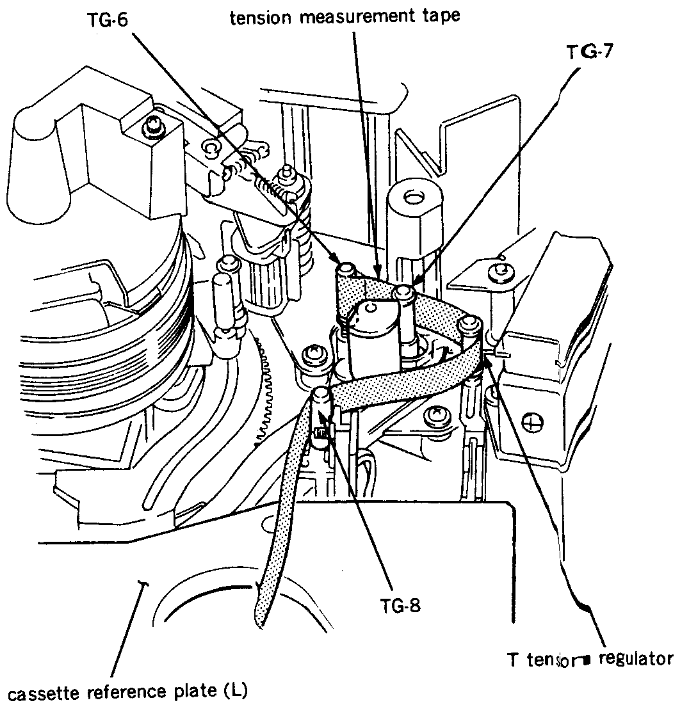
Tools

Cassette reference plate (L)	J-6320-880-A
Dial tension gauge	J-6327-850-A
Tension measurement tape	J-6327-930-A (Refer to Section 5-1.)
Nonslip rubber sheet	J-6327-980-A (Refer to Section 5-1.)
Wire clearance gauge	J-6152-450-A
Cleaning piece	2-034-697-00
Cleaning fluid	9-919-573-01

Check

1. Confirm that a reel table is in S cassette position. When it is in L cassette position, turn the POWER to ON once, change it to S cassette position, according to the Maintenance Menu "B027: REEL POSITION"
2. Turn the POWER to OFF, and place the cassette reference plate (L) on four cassette pillars.
3. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking it from the front, and put a P slider assmbly to 30 mm back from the threading completion mode.
4. Put one end of the tension measurement tape into TG-6 tape guide as shown in the figure.
5. Thread the tension measurement tape as shown in the figure.
6. Turn a threading motor rotation detection ring of a threading motor block in the clockwise direction by fingers looking it from the front, and put a P slider assmbly to the threading completion mode.

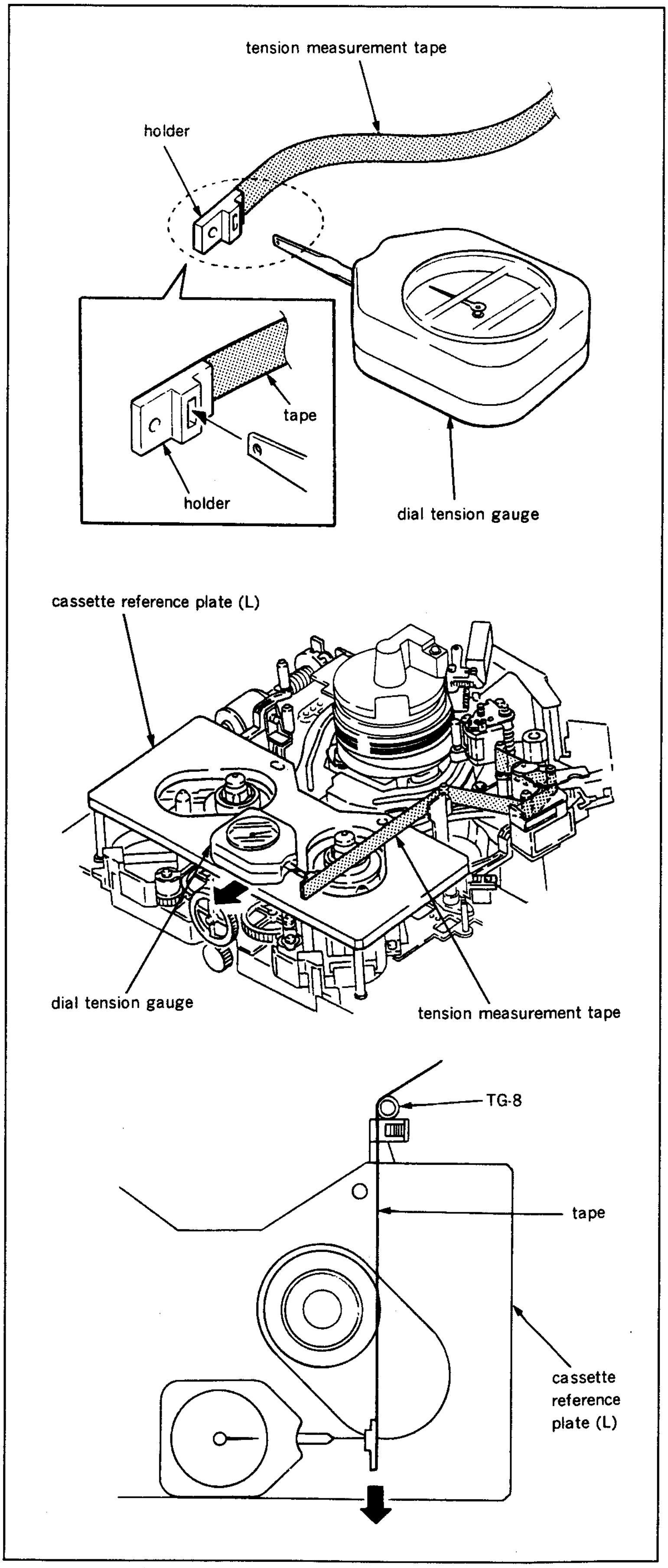

tension measurement tape
TG-6
capstan shaft
P slider
T tension regulator roller


TG-6
tension measurement tape
TG-7
TG-8
T tension regulator
cassette reference plate (L)

7. Put the tip of the dial tension gauge into the holder of the tension measurement tape.
8. Place the dial tension gauge on the cassette reference plate (L), and move the gauge along the cassette reference plate (L) in the direction shown in the figure until the indication of the gauge shows 20 g.

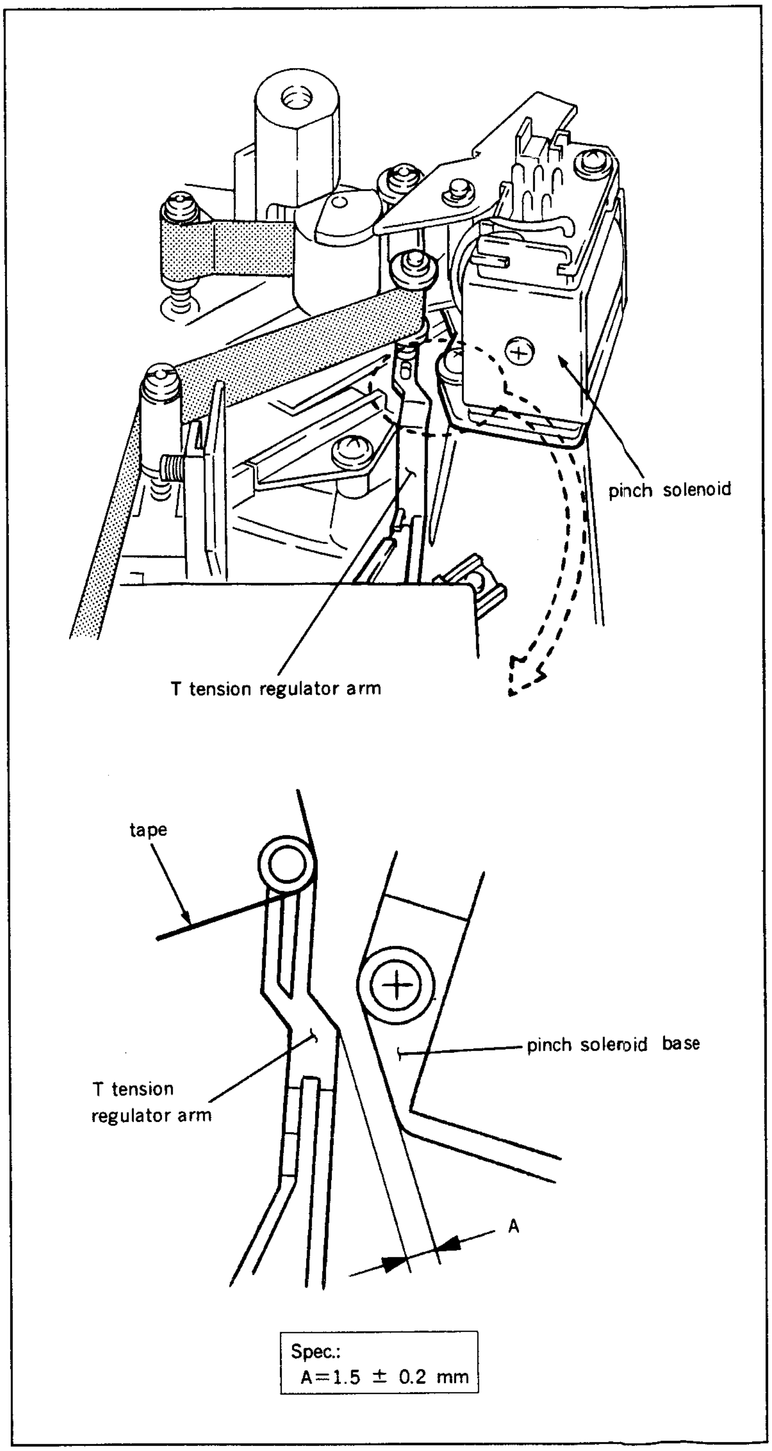
Note 1 : Confirm that the tension measurement tape is placed on every tape guide roller properly.

Note 2 : Pull the tension measurement tape in the parpendicular direction to the cassette reference plate (L).


tension measurement tape
holder
tape
holder
dial tension gauge
cassette reference plate (L)
dial tension gauge
tension measurement tape
TG-8
tape
cassette reference plate (L)

9. When the indication of the gauge is 20 g, confirm that the clearance between a T tension regulator arm and pinch solenoid base satisfy the specification as shown in the figure.

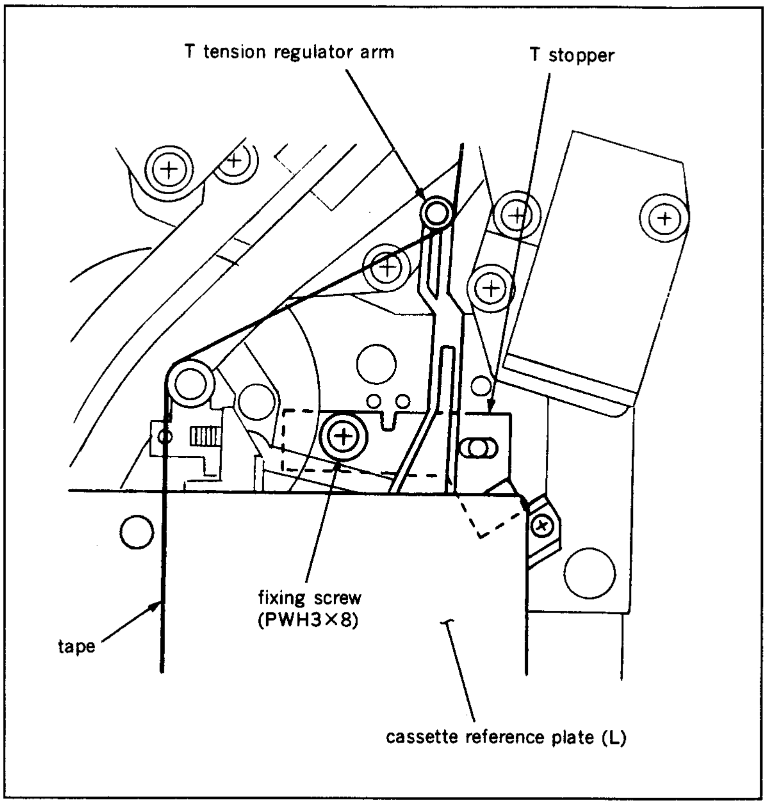
   If the specification is satisfied, perform step (15) and later.
   If the specification is not satisfied, perform step (10) and later.


pinch solenoid
T tension regulator arm
tape
pinch soleroid base
T tension
regulator arm
A

Spec.:
A=1.5 ± 0.2 mm

Adjustment

10. Loosen a fixing screw (PWH3×8) of a T stopper for 1/3 to 1/2 turn.
11. Perform step (8).
12. While keeping the state of step (8), insert a 3 mm flatblade screwdriver into notch of the T stopper, and adjust position of the T stopper so that the specification is satisfied.
13. Tighten the fixing screw (PWH3×8) of the S stopper.
14. Reconfirm that the specificatin is satisfied according to the check procedure.
15. After adjustment, turn a threading motor rotation detection ring of a threading motor block in the counterclockwise direction by fingers looking it from the front, and put the P slider assmbly to 30 mm back from the threading completion mode.
16. Take out the tension measurement tape from the unit.
17. Turn the POWER to ON, and press EJECT button to put the unit into the unthreading end mode. Take out the cassette reference plate (L).



5-20-2. T Tension Sensor Sensitivity Adjustment

- It is impossible to only confirm whether T tension sensor sensitivity is being properly adjusted. Be sure to adjust T tension sensor sensitivity as the following procedures below, and save the adjustment data in NOV RAM.
- Be sure to perform this adjustment after removing a cassette compartment.

Tool

L shaped wrench (across flat has 0.89 mm)
: 7-700-736-06

Preparation

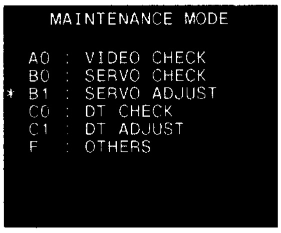
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Adjustment

1. Turn the POWER to OFF, and put Bit4 of S601 on SS-48P board in CLOSE state.
2. Turn the POWER to ON. When the POWER is turned ON, threading automatically starts. Press EJECT button to put the unit in EJECT completion mode.
3. Loosen a setscrew of a T tension regulator arm assembly for 1/4 to 1/3 turn.
4. Push S302 and put the unit into maintenance mode.
5. Press the search dial to enter the jog mode, and move * mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
7. Move * mark to "B113: T TENSION SENSOR" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board to execute "T TENSION SENSOR" menu.
9. Press PLAY button to put the unit in PLAY mode.
10. Move * mark to "READY" which is displaying on the monitor screen with the search dial.
11. Press S302 on SS-48P board.

S601-4/SS-48P : CLOSE

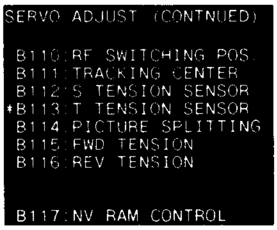
press S302



```
    MAINTENANCE MODE

 A0  :  VIDEO CHECK
 B0  :  SERVO CHECK
* B1  :  SERVO ADJUST
 C0  :  DT CHECK
 C1  :  DT ADJUST
 F   :  OTHERS
```

select with search dial

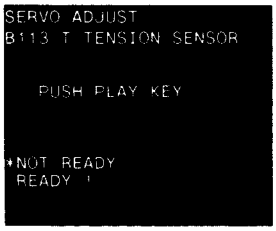
press S302



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
*B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


 B117:NV RAM CONTROL
```

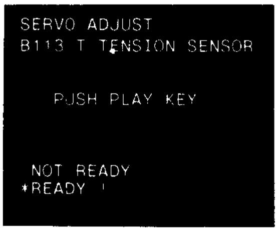
select with search dial

press S302



```
SERVO ADJUST
B113 T TENSION SENSOR


   PUSH PLAY KEY



*NOT READY
 READY !
```

press PLAY button



```
 SERVO ADJUST
 B113 T TENSION SENSOR


    PUSH PLAY KEY



  NOT READY
 *READY !
```

select with search dial

press S302

12. First, use a flatblade screwdriver to rotate the adjusting screw of the T tension regulator arm assembly counterclockwise slowly until the display on the monitor screen changes (turn three to four rotation).
    Then rotate the adjusting screw slowly until data displayed on the monitor screen changes to values between -10 and 10, and the data must be kept in increasing state.

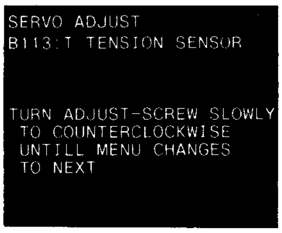
Note 1 : Make sure to rotate the flatblade screwdriver counterclockwise.

Note 2 : While adjusting screw is rotated, the data will keep on increasing and decreasing. In this adjustment, the data must be kept in increasing state and adjusted to meet the specification.
For example : 0001, 0002, 0003, 0004,... data shown in the monitor screen is increasing.
0002, 0001, 0000, -0001,...data shown in the monitor screen is decreasing.

13. Tighten a setscrew of the T tension regulator arm assembly.

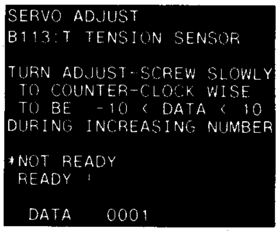
Note : Be extremely careful because of take-up reel table is rotating in high speed.

14. After tightening the setscrew, confirm that the data shown in the monitor screen remains within the range of the specification when the T tension regulator arm is moved right and left with fingers.
15. Move * mark to "READY" which is displaying on the monitor screen with the search dial.
16. Press S302 on SS-48P board.
17. Press EJECT button to put the unit into the unthreading completion mode.



```
SERVO ADJUST
B113:T TENSION SENSOR


TURN ADJUST-SCREW SLOWLY
 TO COUNTERCLOCKWISE
 UNTILL MENU CHANGES
 TO NEXT
```

Turn adjusting screw counterclockwise direction.

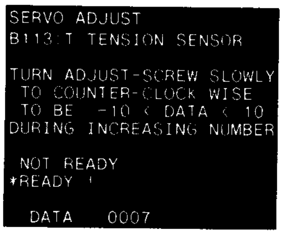


```
SERVO ADJUST
B113:T TENSION SENSOR

TURN ADJUST-SCREW SLOWLY
 TO COUNTER-CLOCK WISE
 TO BE  -10 < DATA < 10
DURING INCREASING NUMBER

*NOT READY
 READY !

  DATA   0001
```

Rotate the adjusting screw unitl data displayed changes to value between −10 and 10, (must be kept in increasing state).

tighten a setscrew

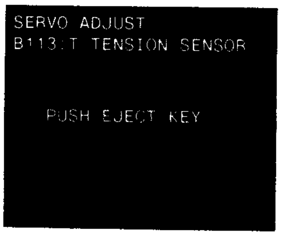
Confirm that the data remains within the range of the specification when the T tension regulator arm is moved right and left with fingers.



```
SERVO ADJUST
B113:T TENSION SENSOR

TURN ADJUST-SCREW SLOWLY
 TO COUNTER-CLOCK WISE
 TO BE  -10 < DATA < 10
DURING INCREASING NUMBER

 NOT READY
*READY !

  DATA   0007
```

select with search dial

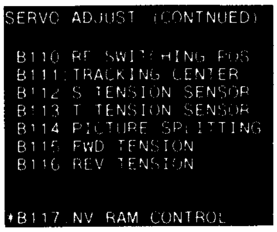
press S302



```
SERVO ADJUST
B113:T TENSION SENSOR



   PUSH EJECT KEY
```

press EJECT button

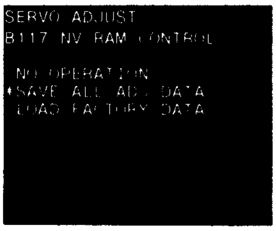
18. Press S303 on SS-48P board to menu screen.
19. Move * mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
20. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
21. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
22. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
23. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.
24. Turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS
 B111:TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


*B117:NV RAM CONTROL
```

select with search dial

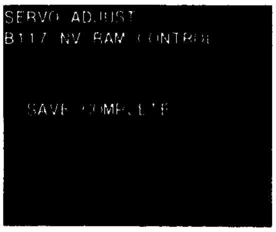
press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ. DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL


  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-21. PINCH PRESS BLOCK REPLACEMENT

Replacement Flow Chart

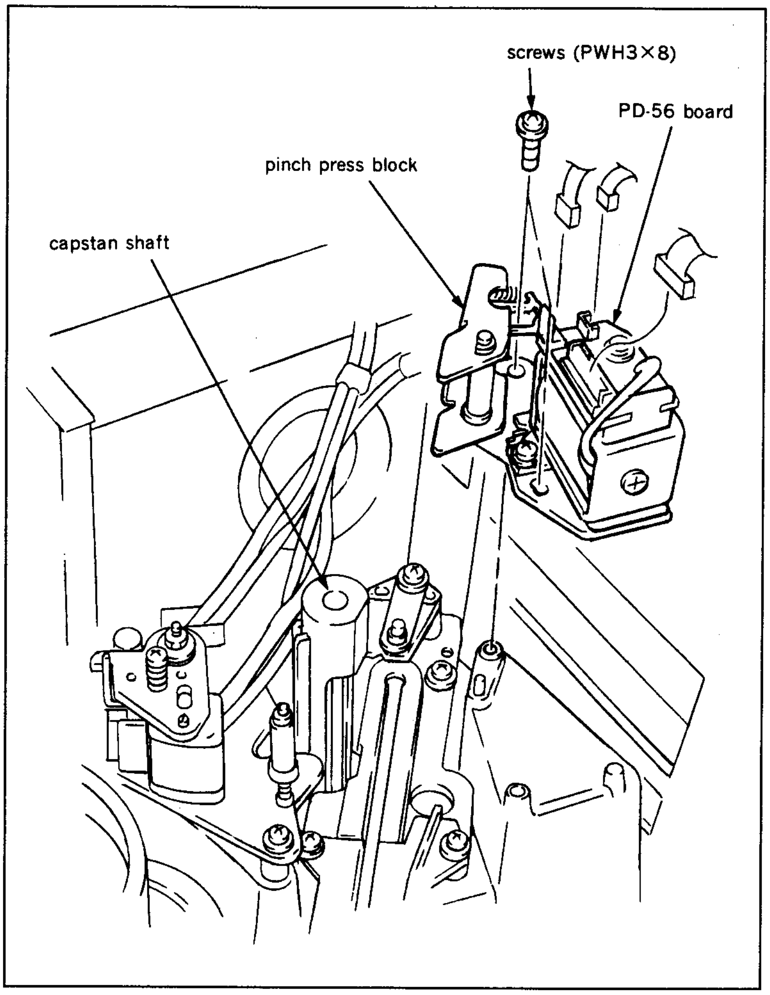
Replacement of pinch press block

↓

Confirmation of pinch solenold position

↓

Confirmation of tape running



Removal

1. Put the unit into unthreading end mode.
2. Disconnect three connectors CN914, CN915 and CN916 from PD-56 board.
3. Remove two screws (PWH3×8) installing a pinch press block and remove it from the unit.

Installation

4. Install a new pinch press block with two screws (PWH3×8) to the unit.
5. Connect three connectors CN914, CN915 and CN916 to PD-56 board.

Adjustment after replacement

6. Perform confirmatiom of pinch solenoid position. (Refer to steps (1) to (9) in Section 5-22-1.)
7. Perform confirmatiom of tape running. (Refer to Sectin 6-3.)

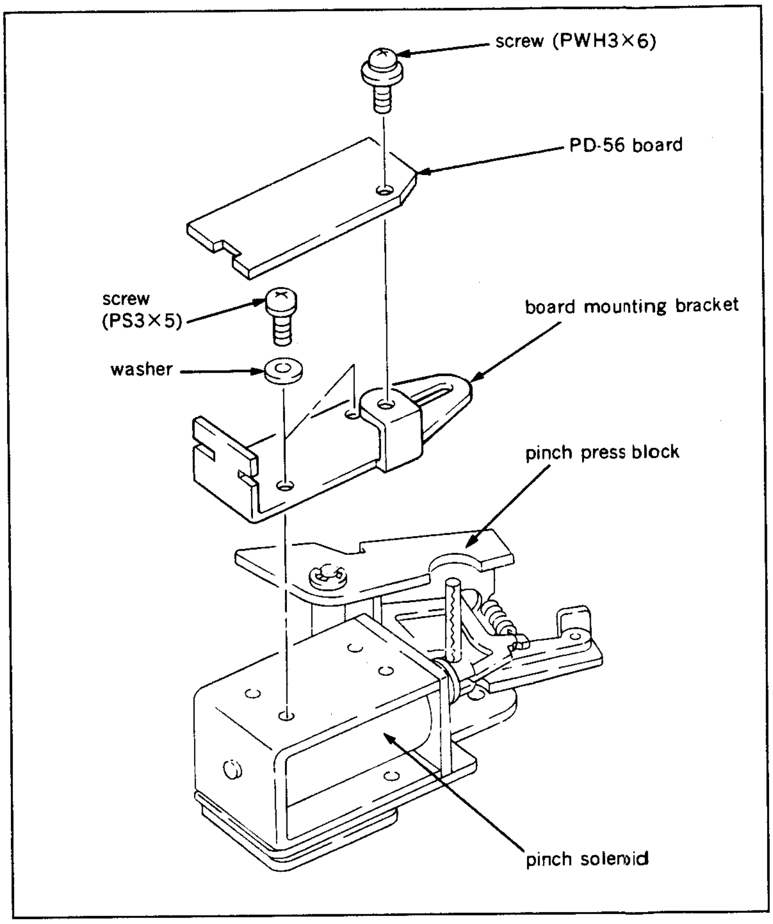
5-22. PINCH SOLENOID REPLACEMENT

Replacement flow chart

Removal of pinch press block
↓
Replacement of pinch solenoid
↓
Installation of pinch press block
↓
Adjustment of pinch solenoid position
↓
Confirmation of tape running

Removal

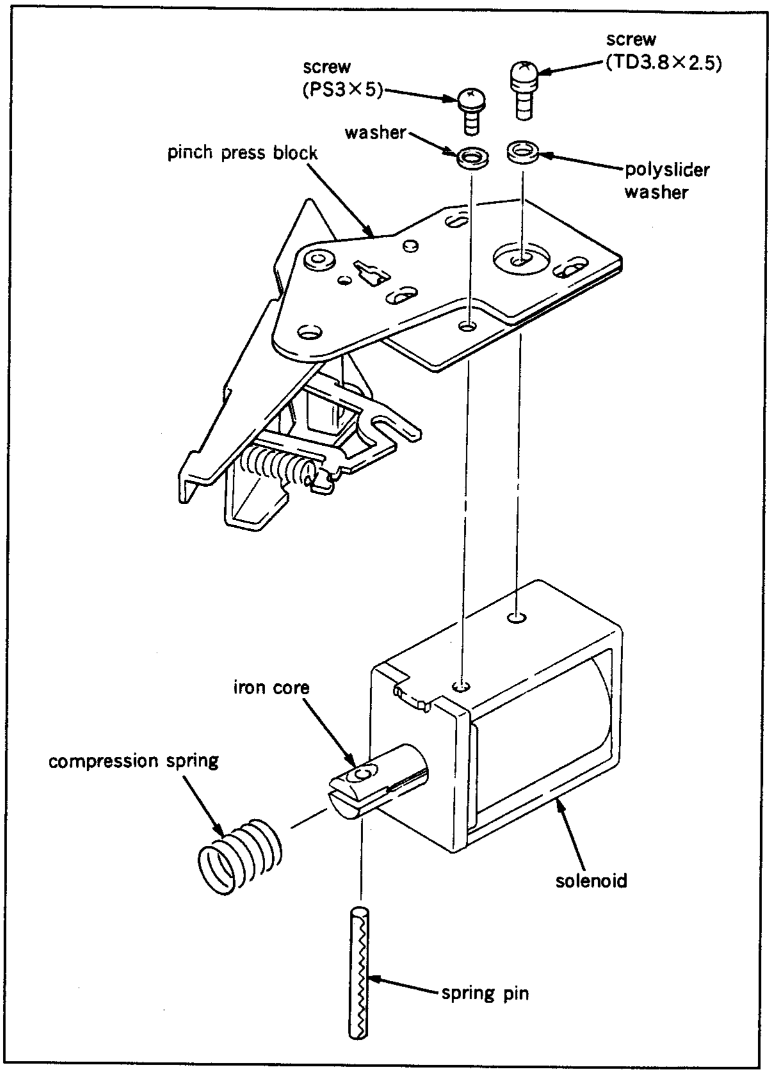
1. Put the unit into unthreading end mode.
2. Disconnect three connectors CN914, CN915 and CN916 from PD-56 board.
3. Remove two screws (PWH3×8) installing a pinch press block and remove it from the unit.
4. Remove PD-56 board and board mounting bracket.


screw (PWH3×6)
PD-56 board
screw (PS3×5)
washer
board mounting bracket
pinch press block
pinch solenoid

5. Remove a spring pin from an iron core of a solenoid.

Note :A compression spring comes off at the same time. Be careful not to lose it.

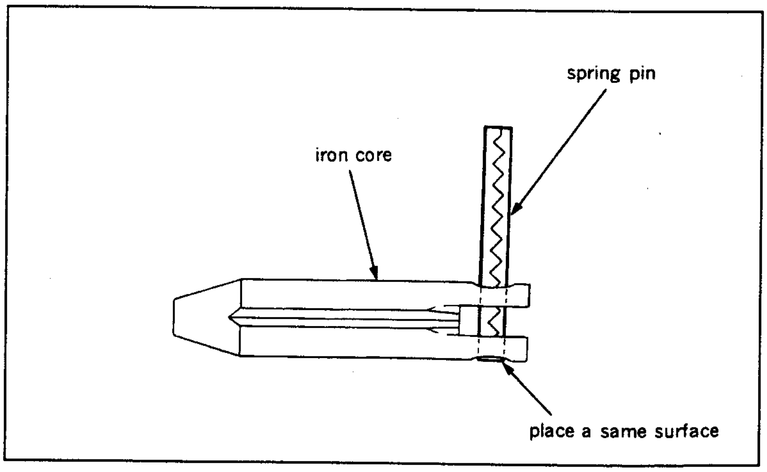
6. Remove two screws (PS3×5 and TD3.8×2.5) and washer (washer and polyslider washer) shown in the figure on the botton side of the pinch press block and remove the solenoid.



screw
(TD3.8×2.5)
screw
(PS3×5)
washer
pinch press block
polyslider washer
iron core
compression spring
solenoid
spring pin

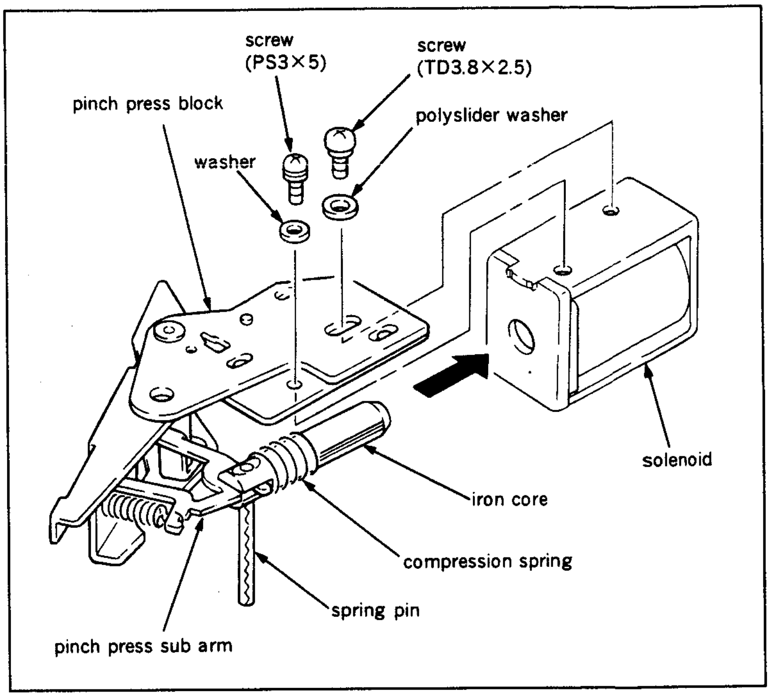
Installation

7. Insert the spring pin into an new iron core so that the edge of the spring pin is the same positioned as outer surface of the iron core as shown in the figure.



spring pin
iron core
place a same surface

8. Insert the compression spring through longer part of the iron core as shown in the figure, and engage the groove of the pinch press sub arm with the spring pin shown in the fugure. Insert the assembled iron core into the hole of the solenoid.
9. Install the new pinch solenoid into the pinch press block with two screws (PS3×5 and TD3.8×2.5) and washers (washer and polyslider washer).
10. After putting the spring pin through the longitudinal hole of the board mounting bracket, install the board mounting bracket with two screws (PS3×5) and washers.
11. Install PD-56 board.
12. Install the pinch press block to the unit with two screws (PWH3×8).
13. Connect CN914, CN915 and CN916 to PD-56 board.


screw
(PS3×5)
screw
(TD3.8×2.5)
pinch press block
polyslider washer
washer
solenoid
iron core
compression spring
spring pin
pinch press sub arm

Adjustment after Replacement

14. Perform pinch solenoid position adjustment. (Refer to Section 5-22-1.)
15. Perform confirmation of tape running. (Refer to Section 6-3.)

5-22-1. Pinch Solenoid Position Adjustment

- Make sure to perform this adjustment when a pinch press block and/or pinch solenoid is removed or replaced.

Tool

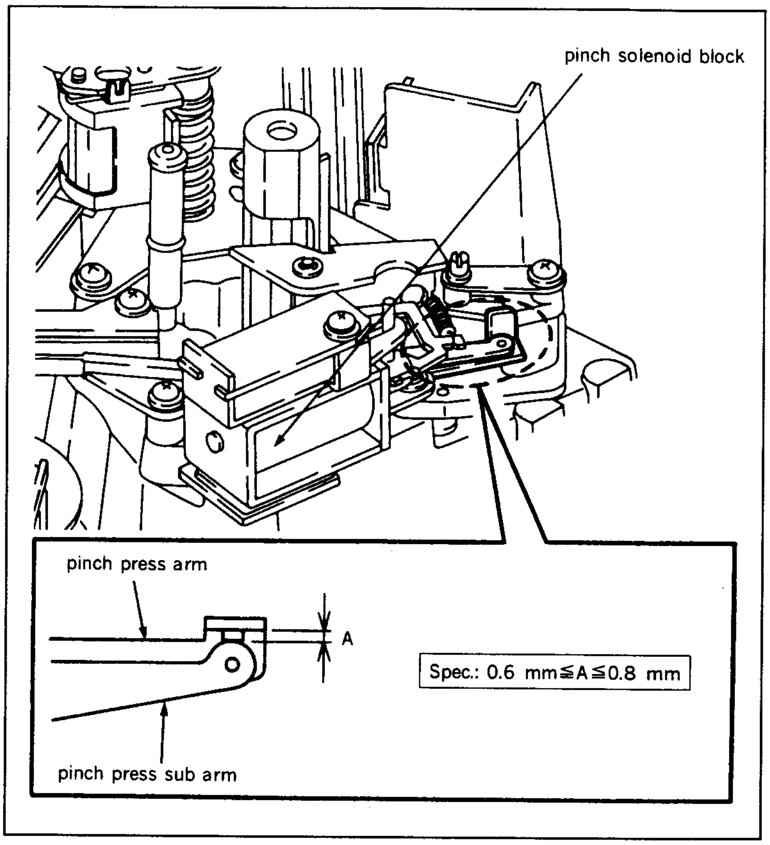
Wire clearance gauge : J-6152-450-A

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

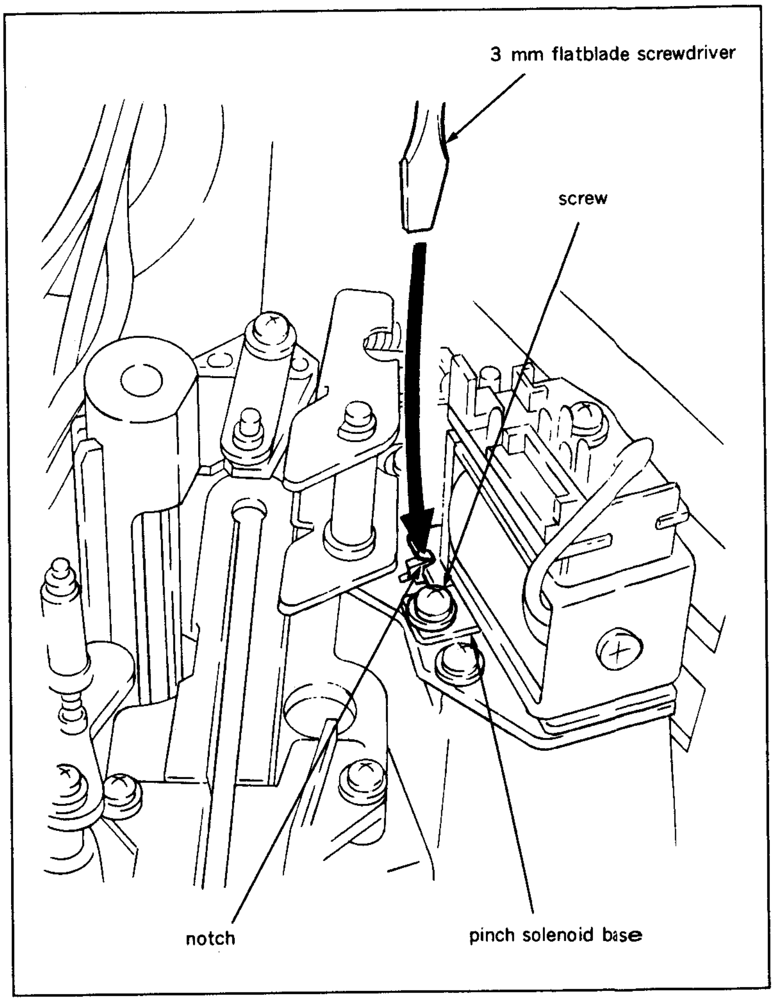
Check

1. Put Bit7 of S601 on SS-48P board in CLOSE state.
2. Turn the POWER to ON, and push S302 to put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move * mark to "B0: SERVO CHECK" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO CHECK" mode.
5. Move * mark to "B03: PLUNGER SOL. CHECK" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to select "PLUNGER SOL. CHECK" menu.
7. Move * mark to "B031: PINCH ROLLER" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board to put the pinch solenoid into the energized state.
9. Confirm that the clearance between a pinch press arm and pinch press sub arm satisfy the specification as shown in the figure.
   If the specification is satisfied, perform step (13) and later.
   If the specification is not satisfied, perform step (10) and later.



Adjustment

10. Loosen a screw of the pinch solenoid base for 1/2 to 1 turn.
11. Insert a 3 mm flatblade screwdriver into the notch of the pinch solenoid base, and adjust the position of the pinch solenoid to satisfy the specification.
12. After tightening a screw, reconfirm the specification.
13. Press S302 on SS-48P board to put the pinch solenoid into off state.
14. Press S303 twice on SS-48P board to return to the mode screen.
15. Turn the POWER to OFF after adjustment, and put Bit7 of S601 on SS-48P board in OPEN state.


3 mm flatblade screwdriver
screw
notch
pinch solenoid base

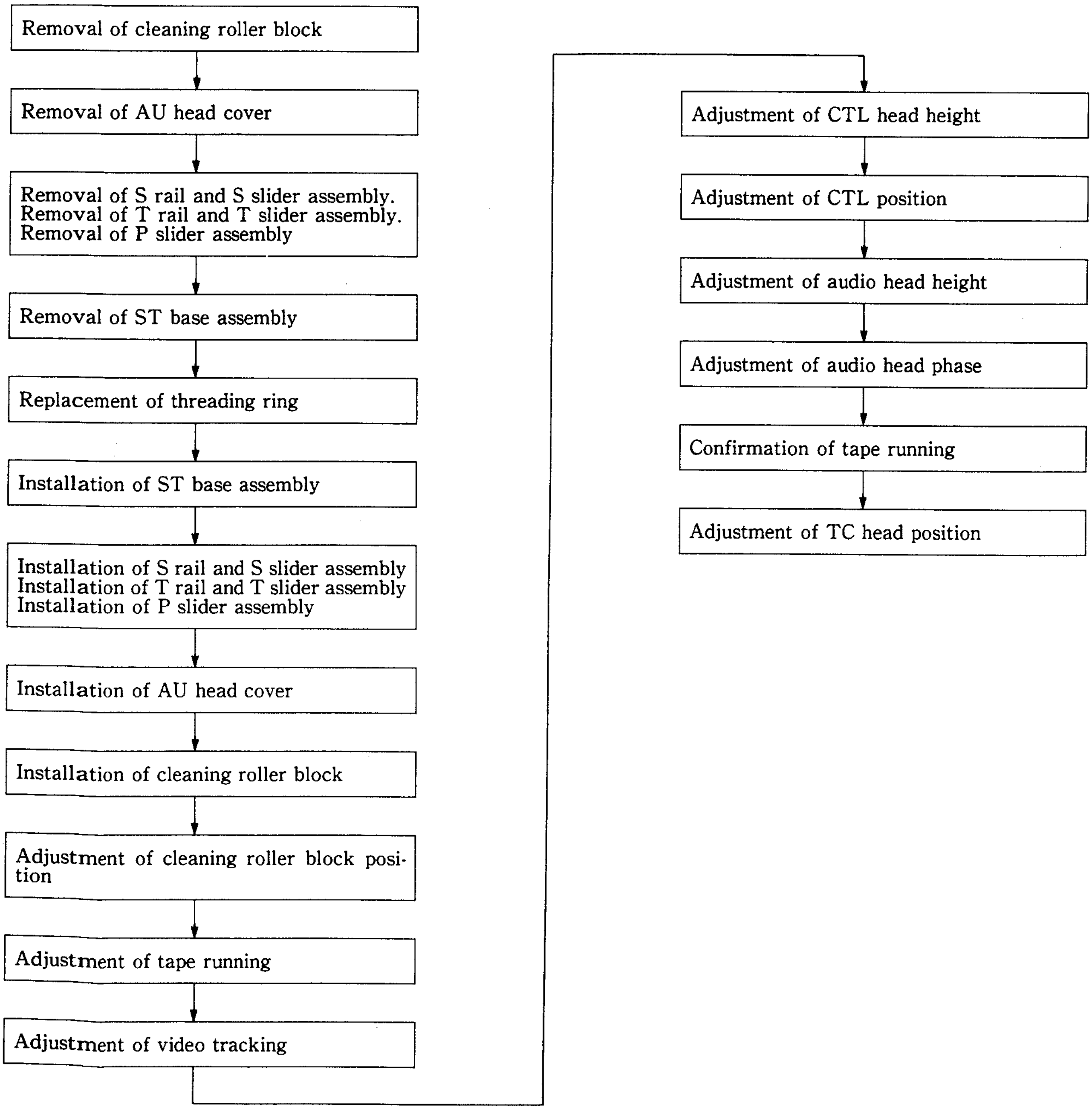
5-23. THREADING RING REPLACEMENT

- It is quite rare to replace a threading ring. In case the replacement is necessary, be extremely careful with the gear engagement adjustment of the threading ring and threading gear described in step ⒀.
- If the adjustment is not done correctly, tape can't thread in the correct position.

Tools

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Cassette tape (BCT-20M)

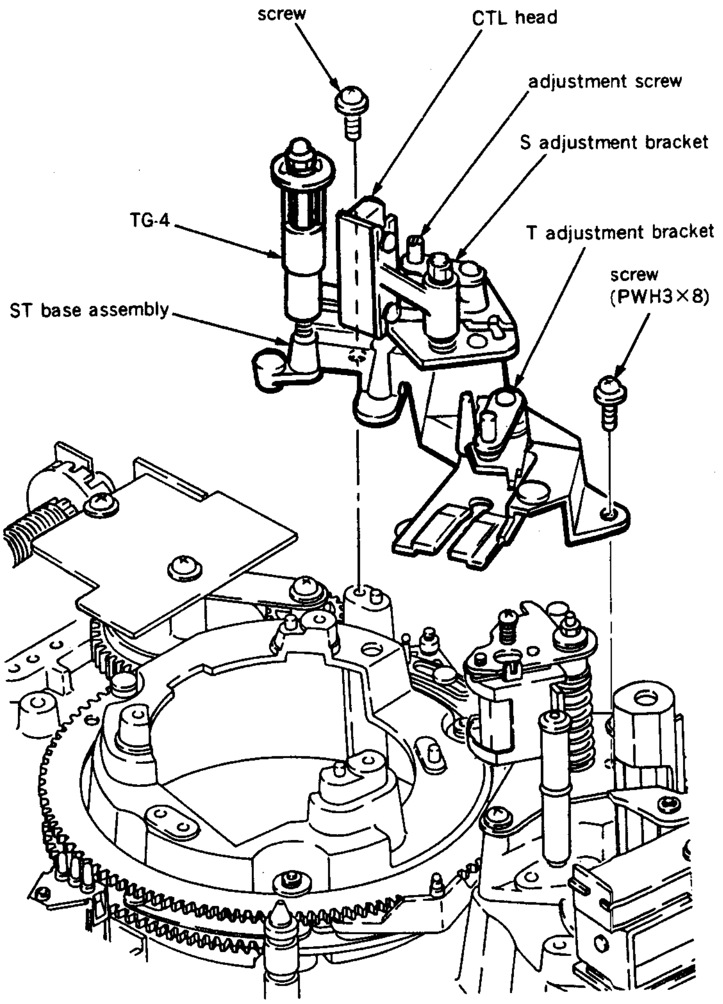
Replacement flow chart


Removal of cleaning roller block
Removal of AU head cover
Removal of S rail and S slider assembly. Removal of T rail and T slider assembly. Removal of P slider assembly
Removal of ST base assembly
Replacement of threading ring
Installation of ST base assembly
Installation of S rail and S slider assembly Installation of T rail and T slider assembly Installation of P slider assembly
Installation of AU head cover
Installation of cleaning roller block
Adjustment of cleaning roller block position
Adjustment of tape running
Adjustment of video tracking
Adjustment of CTL head height
Adjustment of CTL position
Adjustment of audio head height
Adjustment of audio head phase
Confirmation of tape running
Adjustment of TC head position

Removal

1. Remove a cleaning roller block.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. At this time, the harness clamper of the drum comes off together. (Refer to step (3) in Section 5-3.)
3. Place a reel table to the L cassette position.
4. Remove a S rail and S slider assembly.
   (Refer to steps (1) to (6) in Section 5-16.)
5. Remove a T rail and T slider assembly. (Refer to steps (5) to (10) in Section 5-17.)
6. Remove a P slider assembly. (Refer to steps (6) and (7) in Section 5-18.)
7. Disconnect connectors from a drum which are connected to RP board.
8. Remove two screws (PWH3×8) of a ST base assembly, and place it on the power block.

Note : Be careful not to loose or tighten the adjustment screws of a S adjustment bracket and T adjustment bracket, and also not to change height of a CTL head and TG-4 tape guide on the ST base assembly.
It is recomended to cover the CTL head with gauze to prevent make damage of tape running surface of the CTL head.


screw
CTL head
adjustment screw
S adjustment bracket
TG-4
T adjustment bracket
screw
(PWH3×8)
ST base assembly

⟨Drum assembly is omitted in this illustration.⟩

9. Turn a threading motor rotation detection ring of a threading motor block by fingers looking it from the front so that match hole "A" of a S threading ring, hole "B" of a T threading ring and in the concave "C" on the slant chassis.

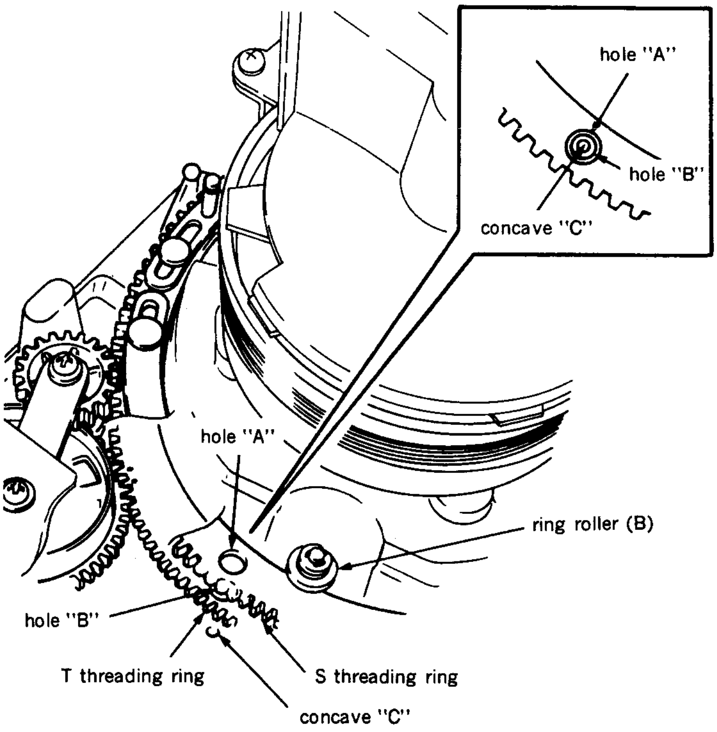
Note 1 : This operation is the important point when installing a new threading ring.

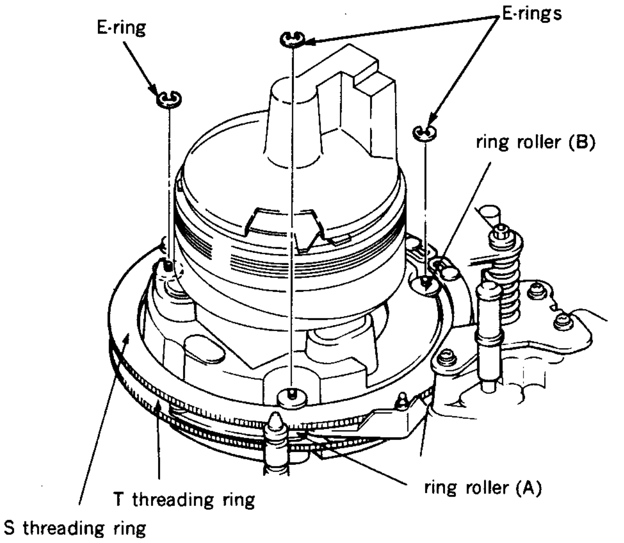
Note 2 : Be extremely careful not to move the threading gear of the threading gear block when performing following step (13).

10. Remove three E-rings on the upper part of a ring roller holding the threading ring.
11. When three ring roller (B)s are removed, then the S threading ring can be removed, and three ring roller (A)s are removed, the T threading ring can be removed.

Installation

12. Clean the inside of a new threading ring to be replaced with the cleaning piece moistened with cleaning fluid.


hole "A"
hole "B"
concave "C"
hole "A"
ring roller (B)
hole "B"
T threading ring
S threading ring
concave "C"

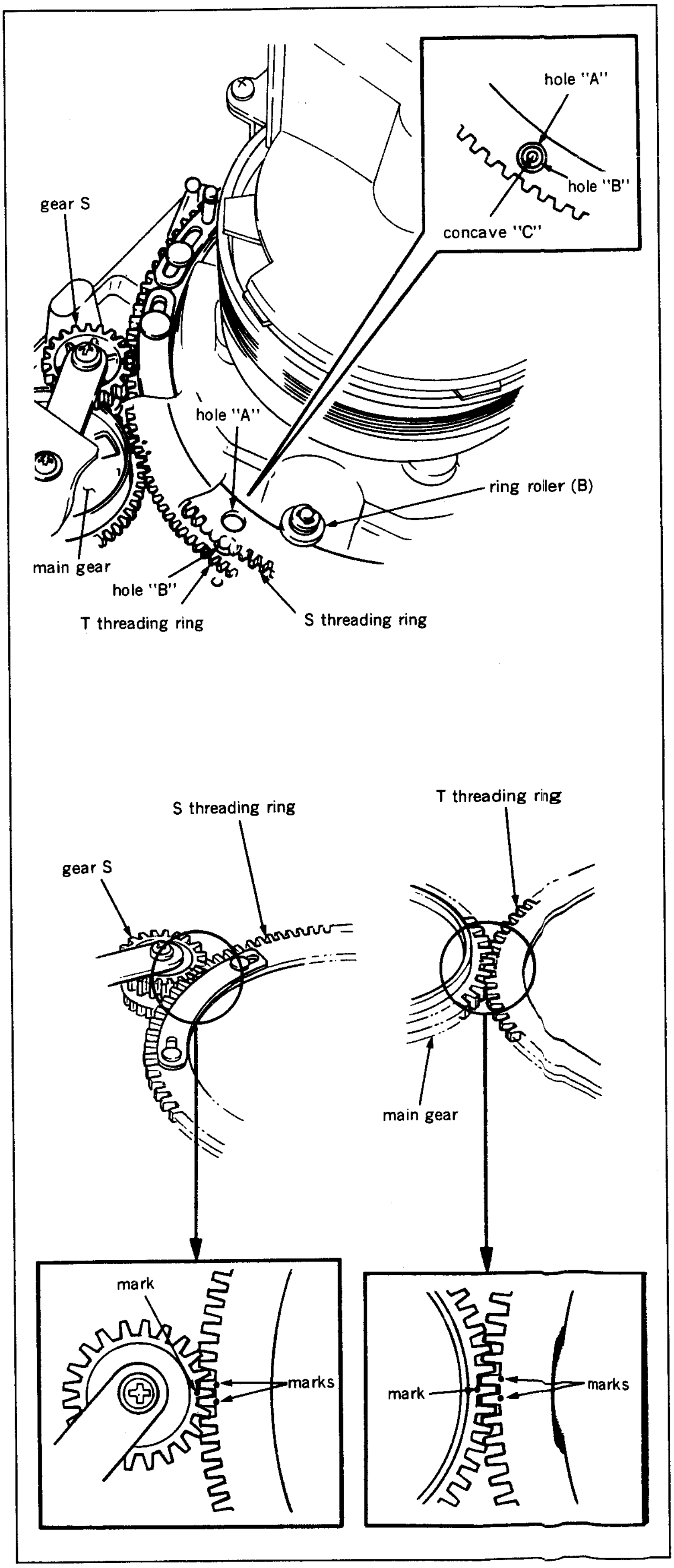

E-ring
E-rings
ring roller (B)
T threading ring
ring roller (A)
S threading ring

13. Install the T threading ring so that engage two marks on the teeth of the T threading ring with a mark on the tooth of the main gear as shown in the figure. Then insert the ring roller (A).

    Install the S threading ring so that engage two marks on the teeth of the S threading ring with a mark on the tooth of the gear S as shown in the figure. Then install the ring roller (B). Make sure that the hole "A" of the S threading ring, hole "B" of the T threading ring and in the concave "C" on the slant chassis are the same position.
14. Install three E-rings to each point on the shaft of the ring roller.
15. Make sure that the threading ring rotates smoothly, when turning the threading motor rotation detection ring of a threading motor block by fingers.
16. Turn the threading motor rotation detection ring of a threading motor block with finger, and place the threading ring to the point of 5 mm back from the threading completion mode.
17. Assemble the ST base assembly, P slider assembly, T slider assembly, T rail, S slider assembly and T rail in the reversing the order of steps (4) to (8).
18. Turn the POWER to ON, make sure that the threading operates properly and smoothly.
19. Insert a casette tape, and make sure that the tape threads to the normal position.

Adjustment after replacement

20. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
21. Perform tape running adjustment.
    (Refer to Section 6-3.)
22. Perform video tracking adjustment.
    (Refer to Section 6-4.)
23. Perform CTL head height adjustment.
    (Refer to Section 6-5.)
24. Perform CTL head position adjustment.
    (Refer to Section 6-6.)
25. Perform audio head height adjustment.
    (Refer to Section 6-7.)
26. Perform audio head phase adjustment.
    (Refer to Section 6-8.)
27. Perform confirmation of tape running.
    (Refer to Section 6-3.)
28. Perform TC head position adjustment.
    (Refer to Section 6-10.)



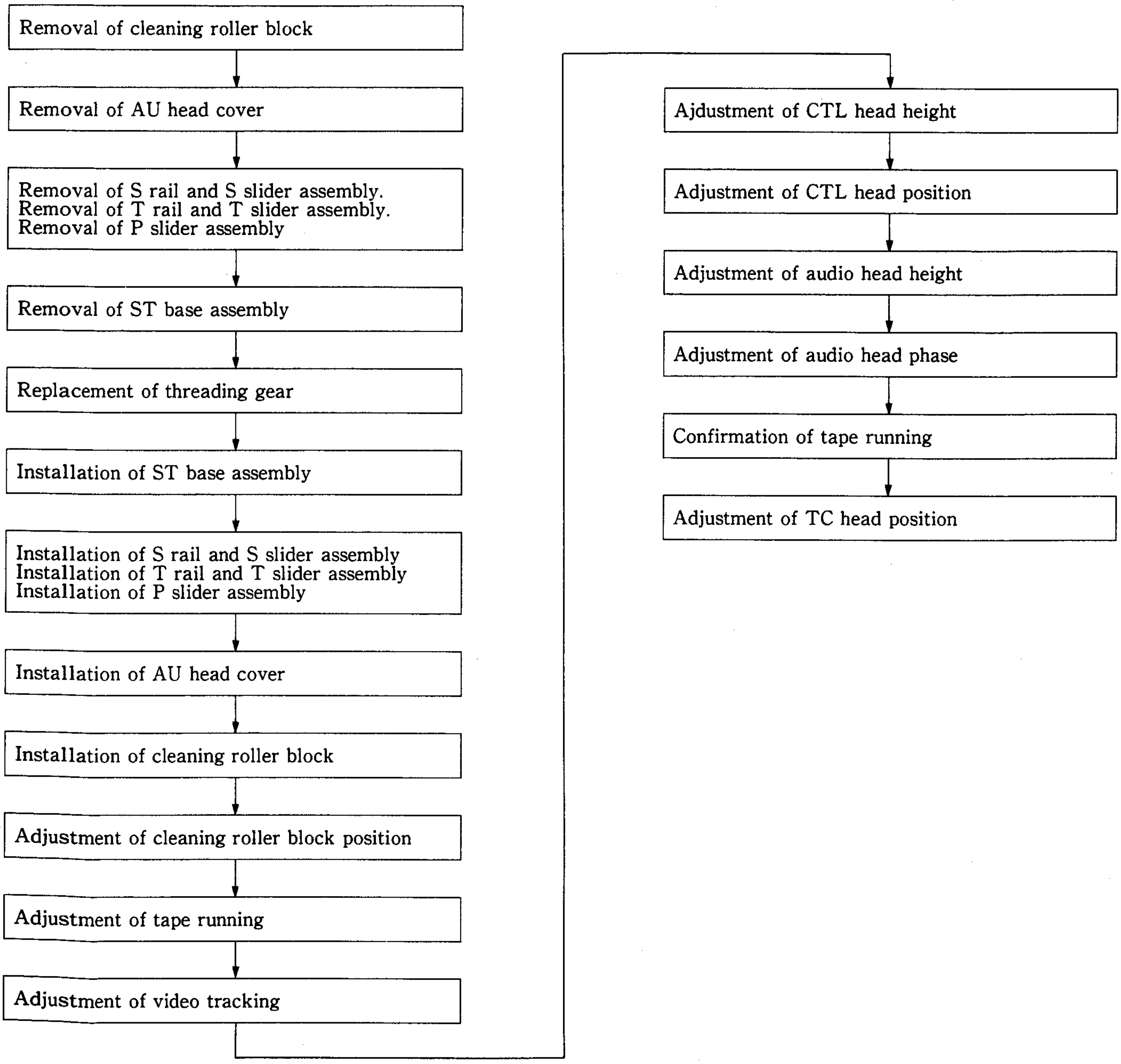
5-24. THREADING GEAR REPLACEMENT

- When a threading gear is replaced, be extremely careful with the gear engagement adjustment of the threading ring and threading gear.
- If this adjustment is not done correctly, tape can't thread in the correct position.

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Cassette tape (BCT 20M)	

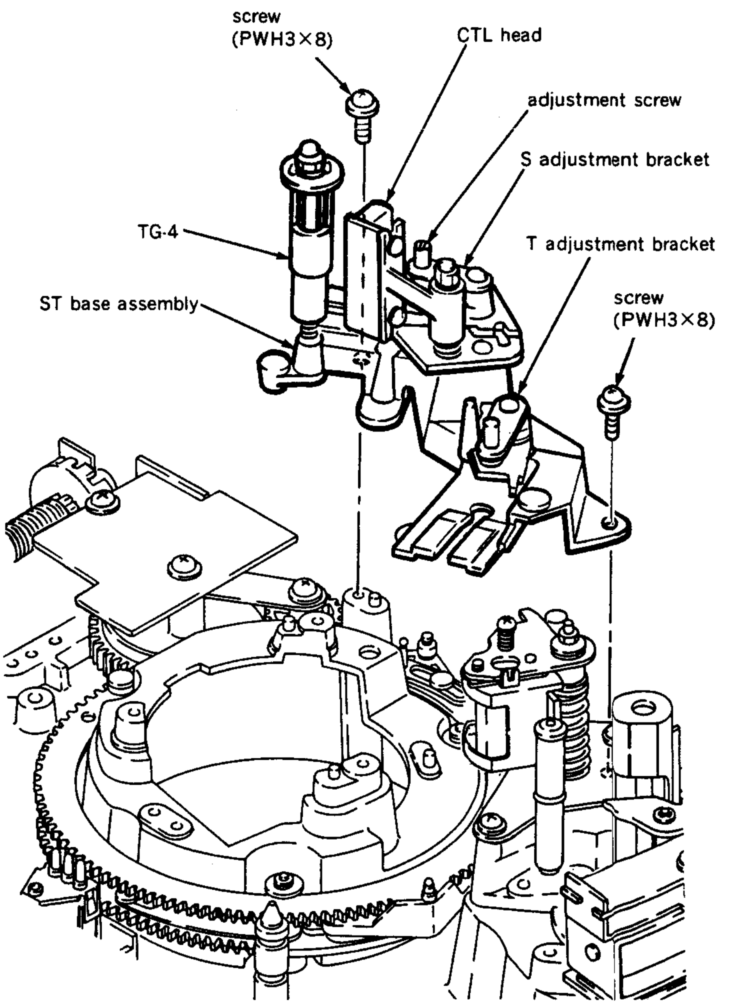
Replacement flow chart


Removal of cleaning roller block
Removal of AU head cover
Removal of S rail and S slider assembly.
Removal of T rail and T slider assembly.
Removal of P slider assembly
Removal of ST base assembly
Replacement of threading gear
Installation of ST base assembly
Installation of S rail and S slider assembly
Installation of T rail and T slider assembly
Installation of P slider assembly
Installation of AU head cover
Installation of cleaning roller block
Adjustment of cleaning roller block position
Adjustment of tape running
Adjustment of video tracking
Ajdustment of CTL head height
Adjustment of CTL head position
Adjustment of audio head height
Adjustment of audio head phase
Confirmation of tape running
Adjustment of TC head position

Removal

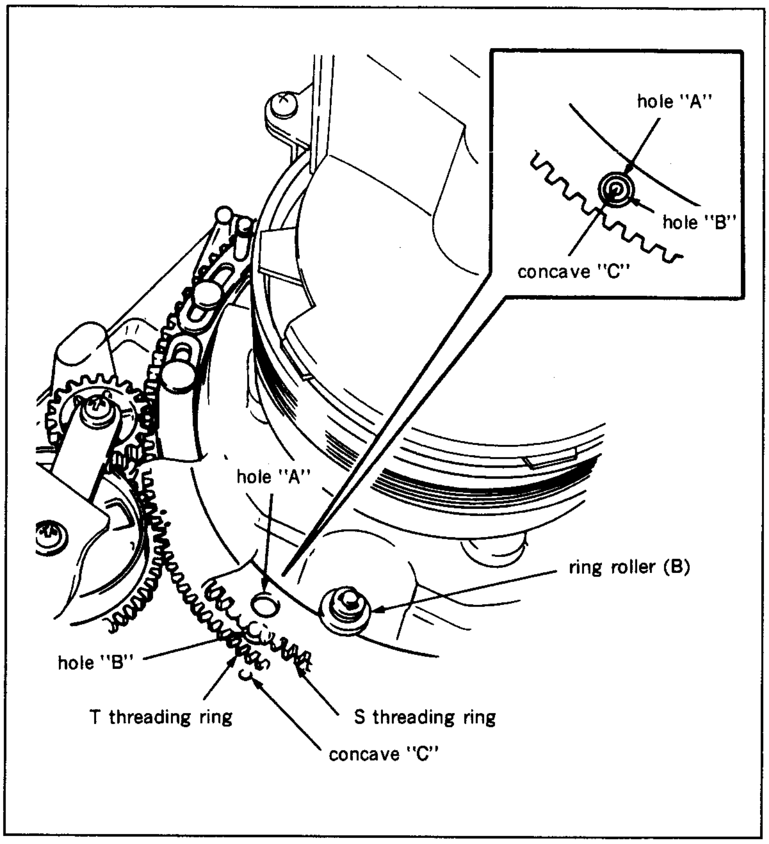
1. Remove a cleaning roller block. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. At this time, the harness clamper of the drum comes off together. (Refer to step (3) in Section 5-3.)
3. Place a reel table to the L cassette position.
4. Remove a S rail and S slider assembly. (Refer to steps (1) to (6) in Section 5-16.)
5. Remove a T rail and T slider assembly. (Refer to steps (5) to (10) in Section 5-17.)
6. Remove a P slider assembly. (Refer to steps (6) and (7) in Section 5-18.)
7. Disconnect connectors from a drum which are connected to RP board.
8. Remove two screws (PSW3×8) of a ST base assembly, and place it on the power block.

Note : Be careful not to loose or tighten the adjustment screws of a S adjustment bracket and T adjustment bracket, and also not to change height of a CTL head and TG-4 tape guide on the ST base assembly.
It is recomended to cover the CTL head with gauze to prevent make damage of tape running surface of the CTL head.

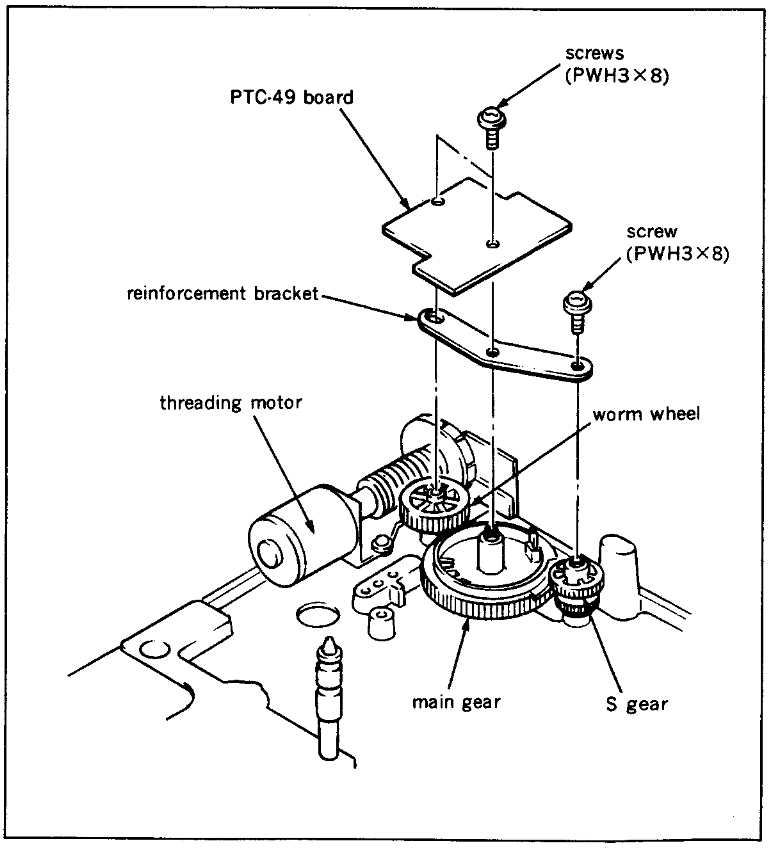

screw
(PWH3×8)
CTL head
adjustment screw
S adjustment bracket
TG-4
T adjustment bracket
ST base assembly
screw
(PWH3×8)

<Drum assembly is omitted in this illustration.>

9. Turn a threading motor rotation detection ring of a threading motor block by fingers looking it from the front so that match hole "A" of a S threading ring, hole "B" of a T threading ring and in the concave "C" on the slant chassis.


hole "A"
hole "B"
concave "C"
hole "A"
ring roller (B)
hole "B"
T threading ring
S threading ring
concave "C"

10. Disconnect connectors CN901, CN902 and CN903 from PTC-49 board. Remove two screws (PWH3×8) of PTC-49 board and remove it from the unit.
11. Remove a screw (PWH3×8) of a reinforcement bracket, and remove it.
12. Remove a worm wheel, S gear and main gear from the unit.

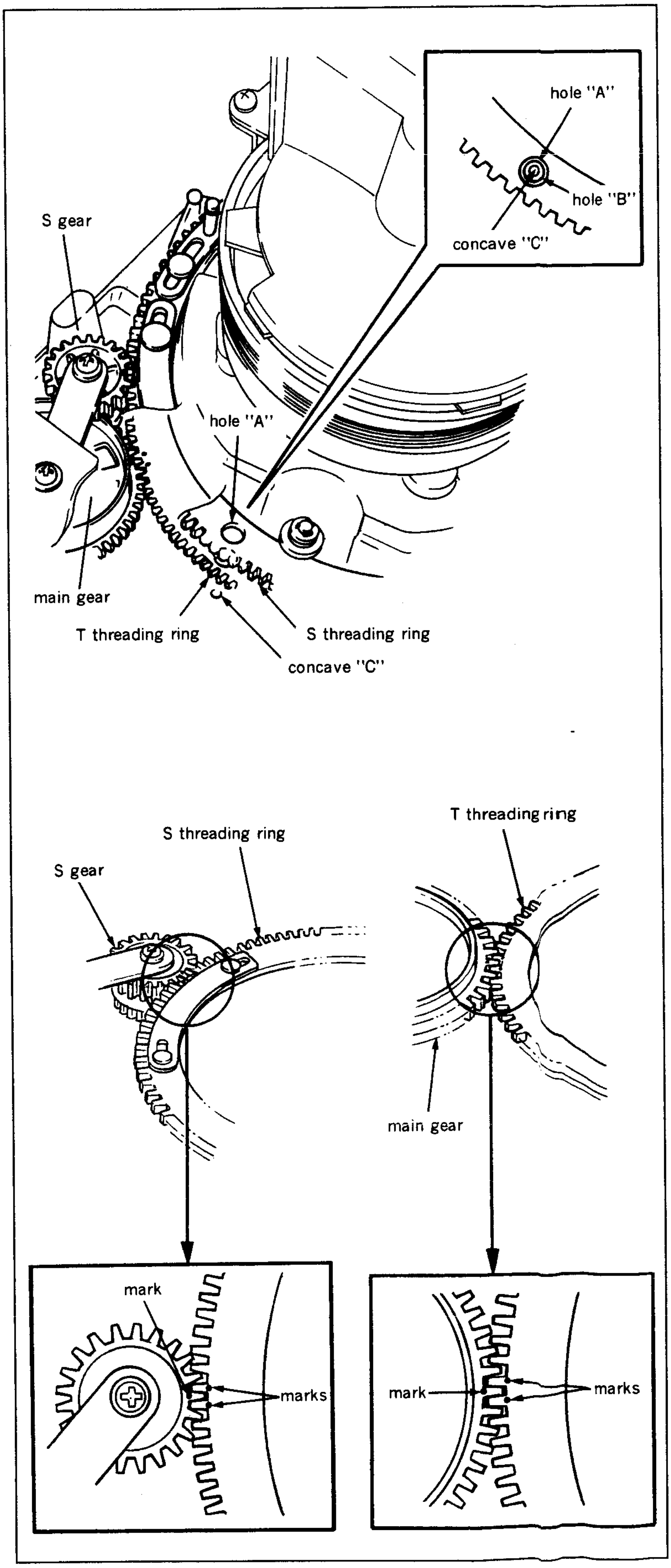

screws
(PWH3×8)
PTC-49 board
screw
(PWH3×8)
reinforcement bracket
threading motor
worm wheel
main gear
S gear

Installation

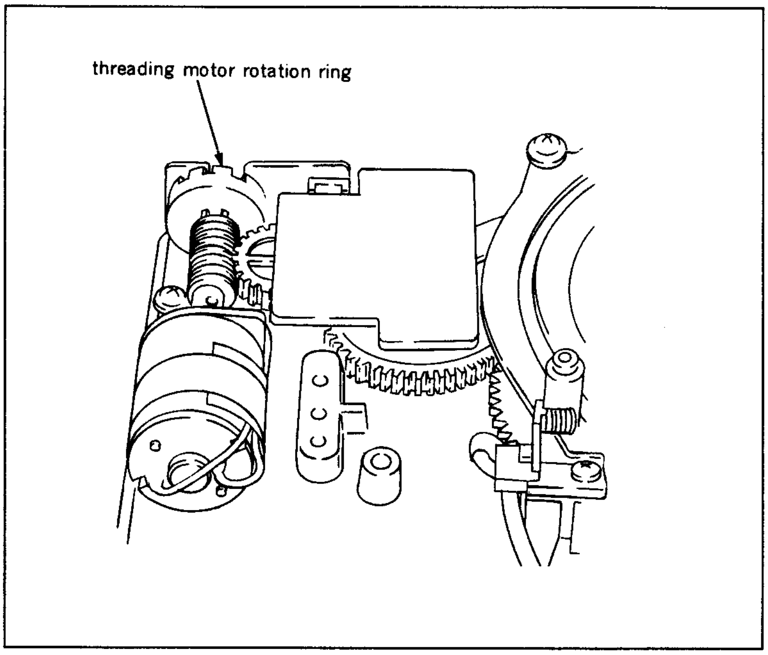
Note 1 : Install the worm wheel and S gear after performing following step (14) main gear engagement adjustment.

Note 2 : When install the S gear, perform following step (15) S gear engagement adjustment.

13. Clean installation shaft for the gear, and hole of the gear with cleaning piece moistened with cleaning fluid.
14. Install the main gear and perform the main gear engagement adjustment.
    (1)Make sure that the hole "A" of the S threading ring, hole "B" of the T threading ring and in the concave "C" on the slant chassis are the same position.
    (2)Install the main gear so that engage two marks on the teeth of the T threading ring with a mark on the tooth of the main gear as shown in the figure.
15. Install the S gear and perform the S gear engagement adjustment.
    (1)Make sure that the hole "A" of the S threading ring, hole "B" of the T threading ring and in the concave "C" on the slant chassis are the same position.
    (2)Install the S gear so that engage two marks on the teeth of the S threading ring with a mark on the tooth of the S gear as shown in the figure.
16. Install the worm wheel.
17. Install the reinforcement bracket.
18. Connect connectors CN901, CN902 and CN903 to PTC-49 board, and install PTC-49 board to the unit.


hole "A"
hole "B"
concave "C"
S gear
hole "A"
main gear
T threading ring
S threading ring
concave "C"
S threading ring
S gear
T threading ring
main gear
mark
marks
mark
marks

19. Turn the threading motor rotation detection ring of a threading motor block with finger, and place the threading ring to the point of 5 mm back from the threading completion mode.
20. Assemble the ST base assembly, P slider assembly, T slider assembly, T rail, S slider assembly and T rail in the reversing the order of steps (4) to (8).
21. Turn the POWER to ON, make sure that the threading operates properly and smoothly.
22. Insert a cassette tape, and make sure that the tape threads to the normal position.



Adjustment after replacement

23. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
24. Perform tape running adjustment.
(Refer to Section 6-3.)
25. Perform video tracking adjustment.
(Refer to Section 6-4.)
26. Perform CTL head height adjustment.
(Refer to Section 6-5.)
27. Perform CTL head position adjustment.
(Refer to Section 6-6.)
28. Perform audio head height adjustment.
(Refer to Section 6-7.)
29. Perform audio head phase adjustment.
(Refer to Section 6-8.)
30. Perform confirmation of tape running.
(Refer to Section 6-3.)
31. Perform TC head position adjustment.
(Refer to Section 6-10.)

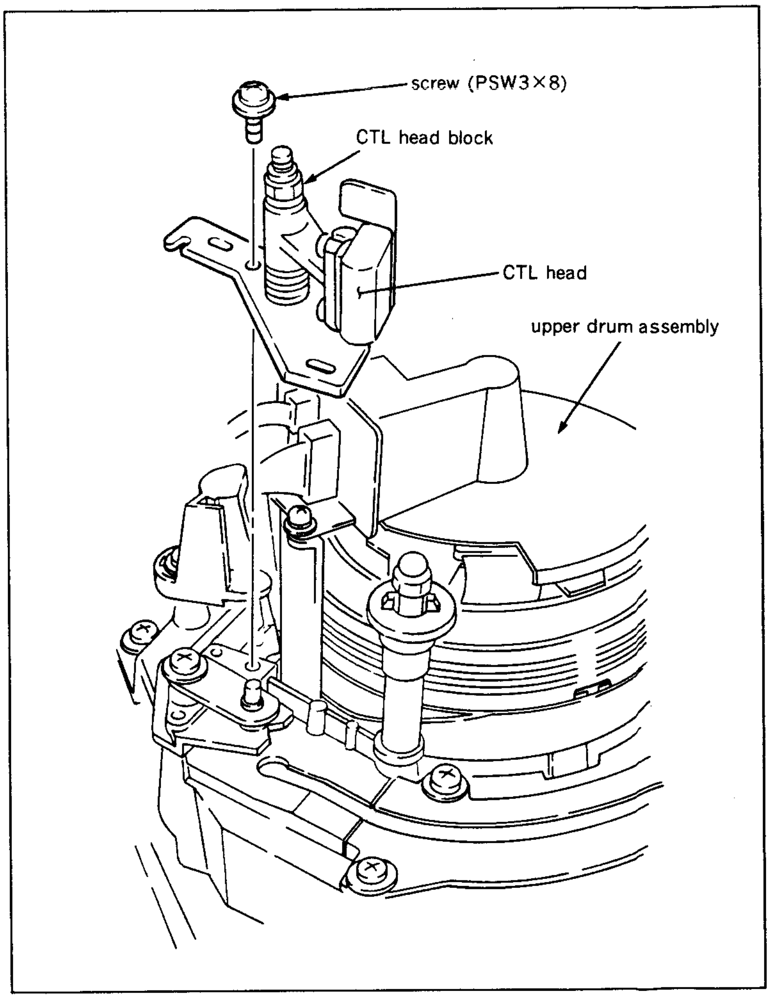
5-25. CTL HEAD REPLACEMENT

Tools

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01

Replacement flow chart

Replacement of CTL head
↓
Adjustment of video tracking
↓
Adjustment of CTL head height
↓
Adjustment of CTL head position
↓
Adjustment of TC head position



Removal

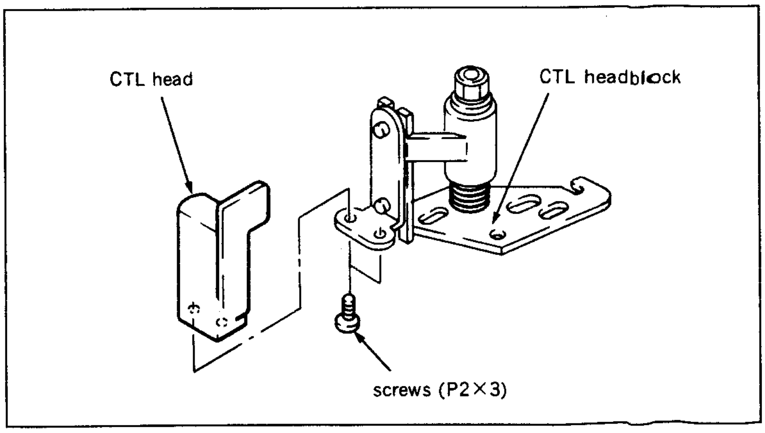
1. Rotate an upper drum assembly by hand, and set the video heads away from a CTL head.
2. Unsolder two lead wires from the CTL head.
3. Loosen a screw (PSW3×8) shown in the figure, remove the CTL head block from the unit.

Note : Never contact the CTL head to the upper drum assembly when removing the CTL head.

4. Loosen two screws (P2×3) at the bottom of the head, and remove the CTL head.

Installation

5. Clean a CTL head side bracket and the installation surface of a new CTL head with a cleaning piece moistened with cleaning fluid.
6. Install the CTL head with two screws (P2×3).
7. Install the assembled CTL head block to the unit.



8. Solder two lead wires to the CTL head.

Note :Solder red lead wire to left side, and white lead wire to right side looking it from the front.

9. Clean the CTL head and TG-4 tape guide with cleaning piece moistened with cleaning fluid.

Adjustment after replacement

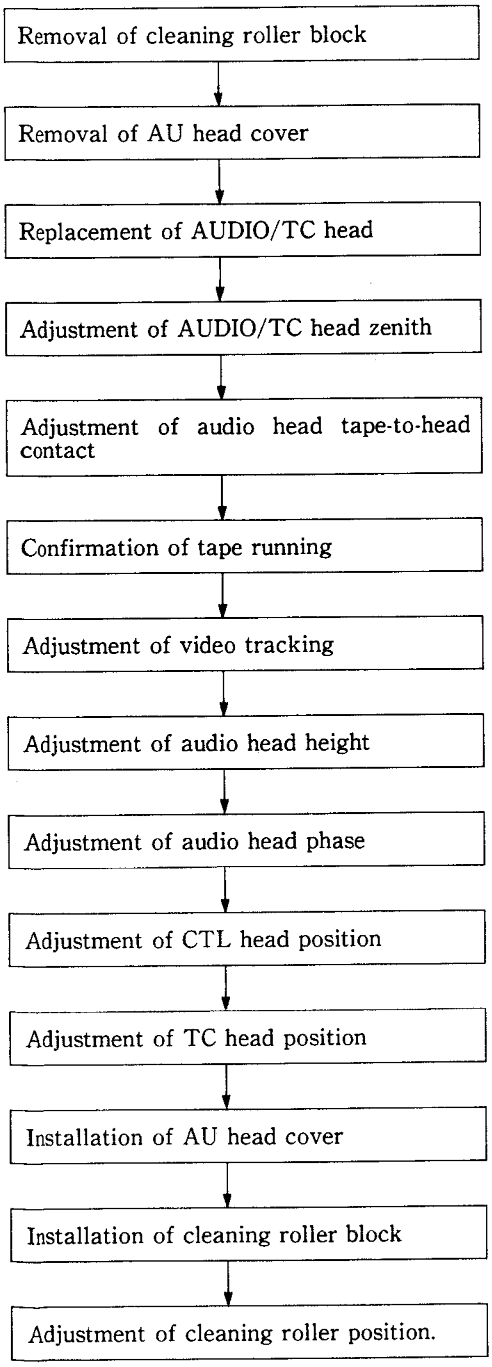
10. Perform video tracking adjustment. (Refer to Section 6-4.)
11. Perform CTL head height adjustment. (Refer to Section 6-5.)
12. Perform CTL head position adjustment. (Refer to Section 6-6.)
13. Perform TC head position adjustment. (Refer to Section 6-10.)

5-26. AUDIO/TC HEAD REPLACEMENT

Tools

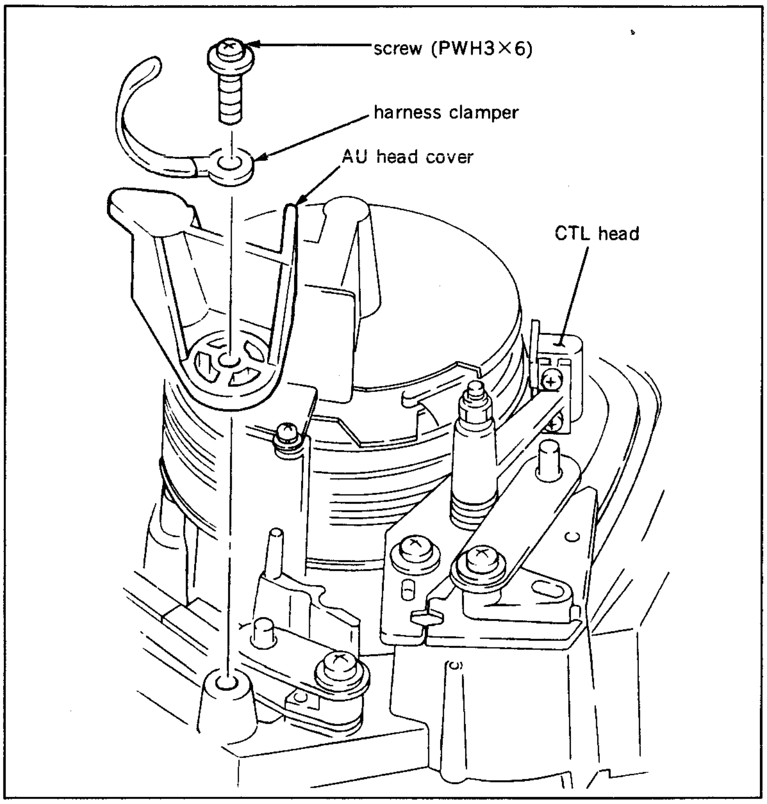
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

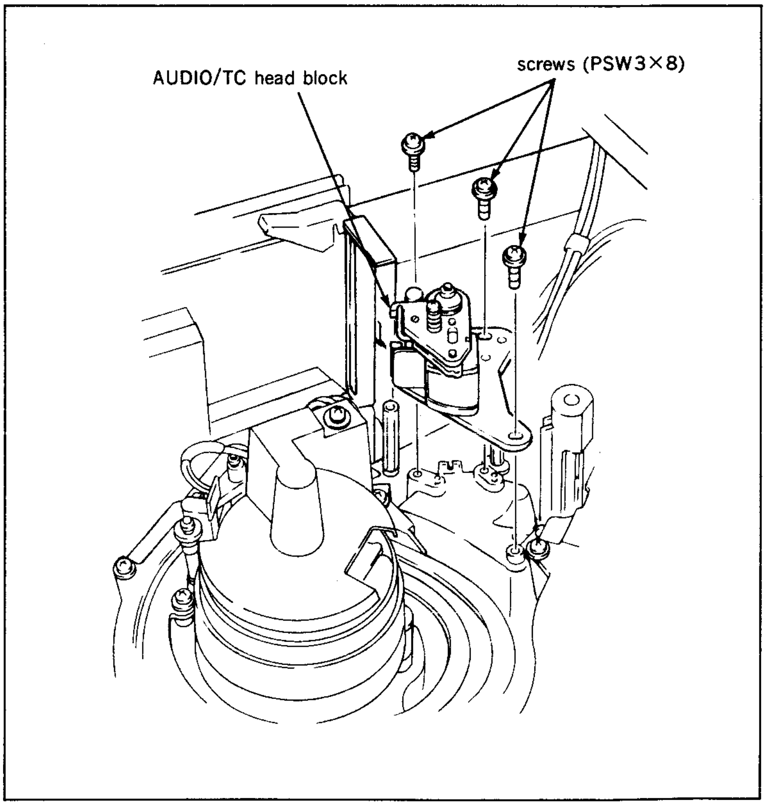
Replacement flow chart


Removal of cleaning roller block
Removal of AU head cover
Replacement of AUDIO/TC head
Adjustment of AUDIO/TC head zenith
Adjustment of audio head tape-to-head contact
Confirmation of tape running
Adjustment of video tracking
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of CTL head position
Adjustment of TC head position
Installation of AU head cover
Installation of cleaning roller block
Adjustment of cleaning roller position.

Removal

1. Remove a cleaning roller block. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. At this time, the harness clamper of the drum comes off together. (Refer to step (3) in Section 5-3.)
3. Disconnect connectors from an AUDIO/TC head which connected with AU-148 board, AU-149 board and AU-150 board.
4. Remove the head harness from the harness clamper.
5. Remove three screws (PSW3×8) which hold the AUDIO/TC head block, and remove the head block from the unit.

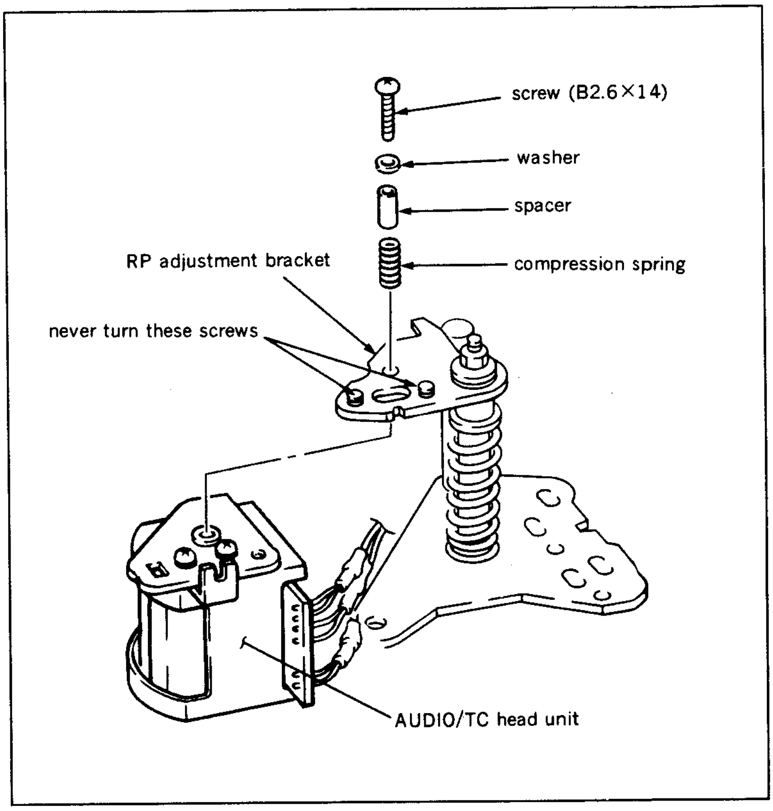

screw (PWH3×6)
harness clamper
AU head cover
CTL head


AUDIO/TC head block
screws (PSW3×8)

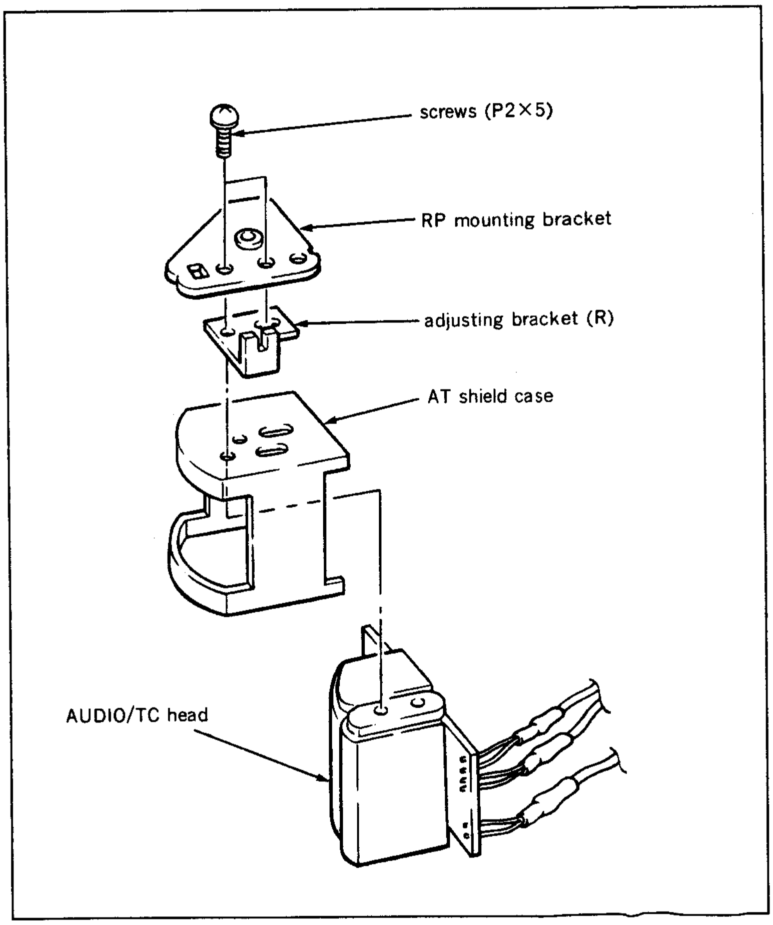
6. Remove a screw (B2.6×14) as shown in the figure, and remove the AUDIO/TC head unit from a RP adjustment bracket.

Note 1 : When removing the screw, pay particular attention not to lose a spacer, compression spring and washer which come off with the screw.

Note 2 : Do not loosen or tighten the two setscrews.


screw (B2.6×14)
washer
spacer
RP adjustment bracket
compression spring
never turn these screws
AUDIO/TC head unit

7. Unsolder all lead wires which connected with the head board.
8. Remove two screws (P2×5) as shown in the figure and remove the AUDIO/TC head.


screws (P2×5)
RP mounting bracket
adjusting bracket (R)
AT shield case
AUDIO/TC head

Installation

9. Clean the installing surface of a new AUDIO/TC head with a cleaning piece moistened with cleaning fluid.
10. Install the AUDIO/TC head, adjusting bracket (R) and RP mounting bracket to the holes on an AT shield case as shown in the figure with two screws.
11. Solder the connectors and lead wires to the AUDIO/TC head board.
    To face in front of the head,
    Left: Connector CN910
    Right: From the top
    Red (with yellow tube)
    White (with yellow tube)
    White (with red tube)
    Red (with red tube)
    Red (with white tube)
    White (with white tube)
12. Install the assembled AUDIO/TC head unit to the RP adjustment bracket.
13. Clean the tape running surface of the AUDIO/TC head with a cleaning piece moistened with cleaning fluid.
14. Install the AUDIO/TC head block with three screws.

Adjustment after replacement

15. Perform AUDIO/TC head zenith adjustment. (Refer to Section 6-2.)
16. Perform AUDIO head tape-to-head contact adjustment. (Refer to Section 6-9.)
17. Perform confirmation of tape running. (Refer to Section 6-3.)
18. Perform video tracking adjustment. (Refer to Section 6-4.)
19. Perform audio head height adjustment. (Refer to Section 6-7.)
20. Perform audio head phase adjustment. (Refer to Section 6-8.)
21. Perform CTL head position adjustment. (Refer to Section 6-6.)
22. Perform TC head position adjustment. (Refer to Section 6-10.)
23. Install the AU head cover and harness clamper of drum harness.
24. Install the cleaning roller block. (Refer to Section 5-6.)
25. Perform cleaning roller position adjustment. (Refer to Section 5-6-1.)

5-27. CAPSTAN MOTOR REPLACEMENT

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Replacement flow chart

Removal of pinch press block

↓

Replacement of capstan motor

↓

Installation of pinch press block

↓

Adjustment of capstan FG duty

↓

Adjustment of capstan free speed

↓

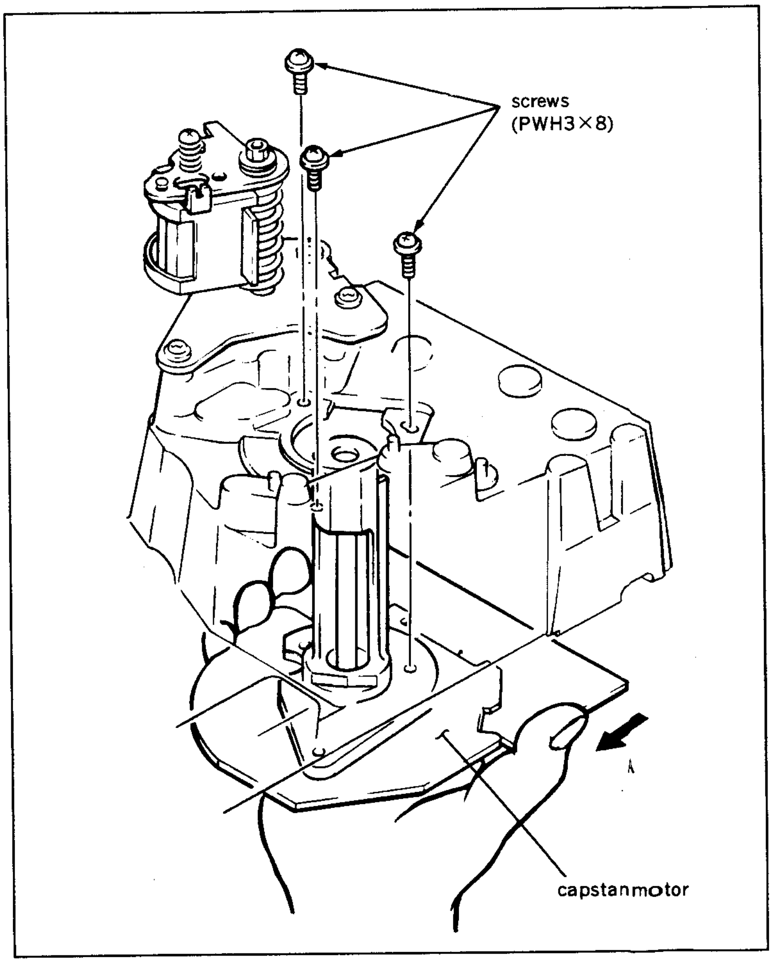
Confirmation of capstan motor operation

↓

Confirmation of pinch solenoid position

↓

Confirmation of tape running



Removal

1. Make sure that the unit is into unthreading end mode.
2. Set the unit up with the left side panel to the bottom.
3. Open DR-118A board.
4. Disconnect a connector of a capstan motor at the back side of the unit.
5. Disconnect three connectors CN914, CN915 and CN916 which connected with PD-56 board on the pinch press block.
6. Remove two screws (PWH3×8) which holding a pinch press block, and remove it from the chassis. (Refer to Section 5-22.)
7. Remove three fixing screws (PWH3×8) of the capstan motor from the top of the unit while holding the capstan motor with hand from the back side of the unit.

Note 1 : Hold the capstan motor with hands to prevent it dropping.

Note 2 : Pay particular attention not to cause damage to the tape guide around the capstan motor.

Installation

8. Clean the installing surfaces of a new capstan motor and the chassis with a cleaning piece moistened with cleaning fluid.
9. Install the capstan motor to the chassis.

Note 1 : Pay particular attention not to cause damage to the capstan shaft.

Note 2 : Pay particular attention not to cause damage to the tape guide around the capstan motor.

10. While pressing the capstan motor, install the capstan motor with three screws (PWH3 × 8).
11. Connect the capstan motor connector.
12. Close DR-118A board, and place the unit to the original position.
13. Clean the capstan shaft with a cleaning piece moistened with cleaning fluid.
14. Install the pinch press block to the chassis with two screws (PWH3 × 8).
15. Connect three connectors CN914, CN915 and CN916 with PD-56 board.

Adjustment after replacement

16. Perform capstan FG duty adjustment. (Refer to Section 5-27-2.)
17. Perform capstan speed adjustment. (Refer to Section 5-27-3.)
18. Perform confirmation of capstan motor operation. (Refer to Section 5-27-1.)
19. Perform confirmation of pinch solenoid position. (Refer to steps (1) to (9) in Section 5-22-1.)
20. Perform confirmation of tape running. (Refer to Section 6-3.)

5-27-1. Capstan Motor Operation Check

- Be sure to perform the capstan motor operation check when a capstan motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

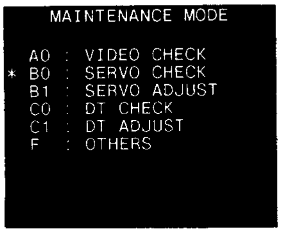
Check

1. Put Bit7 of S601 on SS-48P board in CLOSE state, and press S302 to put the unit into maintenance mode.
2. Press the search dial to enter the jog mode, and move ∗ mark to "B0 : SERVO CHECK" which is displaying on the monitor screen with the search dial.
3. Press S302 on SS-48P board to select "SERVO CHECK" mode.
4. Move ∗ mark to "B02: MOTOR CHECK" which is displaying on the monitor screen with the search dial.
5. Press S302 on SS-48P board to select "MOTOR CHECK" menu.
6. Move ∗ mark to "B025: CAPSTAN MOTOR" which is displaying on the monitor screen with the search dial.
7. Press S302 on SS-48P board to execute "CAPSTAN MOTOR" sub-menu.
8. Press S302 on SS-48P board after "B025: CAPSTAN MOTOR" is appeared on the monitor screen.
   Make sure that "FORWARD...OK" is appeared on the monitor screen.
9. Press S302 on SS-48P board again.
   Make sure that "REVERSE...." appears and then "REVERSE...OK" is displayed on the monitor screen.
   If the above message does not appear, check the capstan motor drive circuit (on DR-118A board).
10. Press S303 twice on SS-48P board to return to the mode screen.

Note : In order to finish "SERVO CHECK" mode in the maintenance mode, turn the POWER switch to OFF, and put Bit7 of S601 on SS-48P board in OPEN state.

S601-7/SS-48P : CLOSE

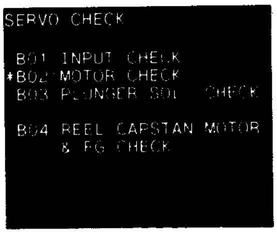
press S302



```
       MAINTENANCE MODE

  A0 : VIDEO CHECK
* B0 : SERVO CHECK
  B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

select with search dial

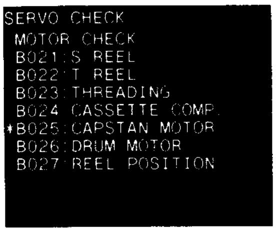
press S302



```
SERVO CHECK

 B01 INPUT CHECK
*B02 MOTOR CHECK
 B03 PLUNGER SOL  CHECK

 B04 REEL CAPSTAN MOTOR
     & FG CHECK
```

select with search dial

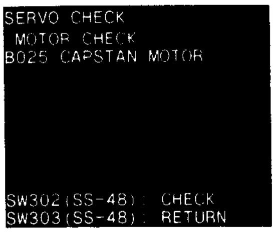
press S302



```
SERVO CHECK
 MOTOR CHECK
 B021:S REEL
 B022:T REEL
 B023:THREADING
 B024 CASSETTE COMP.
*B025:CAPSTAN MOTOR
 B026:DRUM MOTOR
 B027:REEL POSITION
```

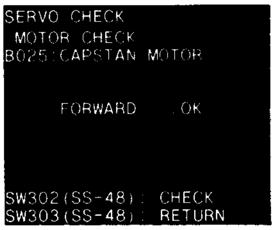
select with search dial

press S302



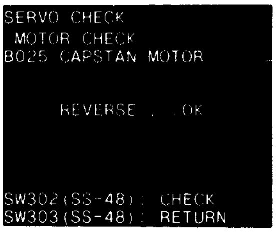
```
SERVO CHECK
 MOTOR CHECK
B025 CAPSTAN MOTOR








SW302(SS-48) :  CHECK
SW303(SS-48) :  RETURN
```

press S302



```
SERVO CHECK
 MOTOR CHECK
B025:CAPSTAN MOTOR


     FORWARD    .OK




SW302(SS-48) :  CHECK
SW303(SS-48) :  RETURN
```

press S302



```
SERVO CHECK
 MOTOR CHECK
B025 CAPSTAN MOTOR

      REVERSE . . OK



SW302(SS-48) : CHECK
SW303(SS-48) : RETURN
```

press S303 twice

S601-7/SS-48P : OPEN

5-27-2. Capstan FG Duty Adjustment

- Be sure to perform the capstan FG duty adjustment when the capstan motor is replaced.

Preparation

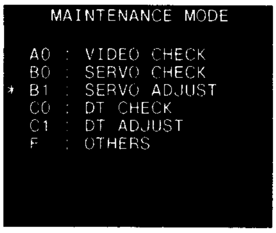
Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1: SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to "B104: CAPSTAN FG DUTY" which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "CAPSTAN FG DUTY".
7. Confirm that the message "COMPLETE" is displayed on the monitor screen. When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.

S601-7/SS-48P : CLOSE

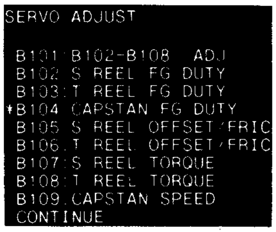
press S302



```
     MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

select with search dial

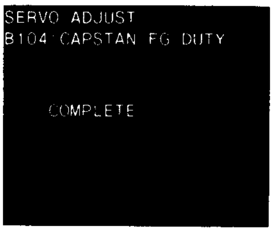
press S302



```
SERVO ADJUST

 B101:B102-B108  ADJ
 B102:S REEL FG DUTY
 B103:T REEL FG DUTY
*B104:CAPSTAN FG DUTY
 B105:S REEL OFFSET/FRIC
 B106:T REEL OFFSET/FRIC
 B107:S REEL TORQUE
 B108:T REEL TORQUE
 B109:CAPSTAN SPEED
 CONTINUE
```

select with search dial

press S302



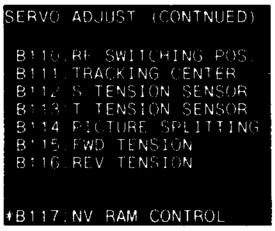
```
SERVO ADJUST
B104:CAPSTAN FG DUTY


     COMPLETE
```

press S303

8. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
9. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
10. Move ∗ mark to "SAVE ALL ADJ. DATA" with the search dial.
11. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
12. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

Note 1 : When "INCOMPLETE" appears on the monitor screen in step (7), press S303 on SS-48P board to return to the menu screen.
Check the capstan motor drive circuit (on DR-118A board) and capstan FG amplifier circuit (on SS-48P board).

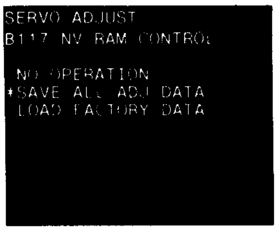
Note 2 : When the SERVO ADJUST" mode is completed, turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.



```
SERVO ADJUST (CONTNUED)

 B110.RF SWITCHING POS.
 B111.TRACKING CENTER
 B112.S TENSION SENSOR
 B113:T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115.FWD TENSION
 B116.REV TENSION


*B117:NV RAM CONTROL
```

select with search dial

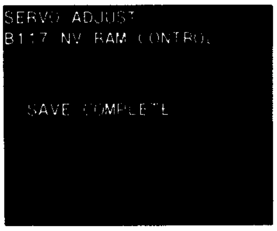
press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL


  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

5-27-3. Capstan Speed Adjustment

- Be sure to perform the capstan speed adjustment when the capstan motor is replaced.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Tool

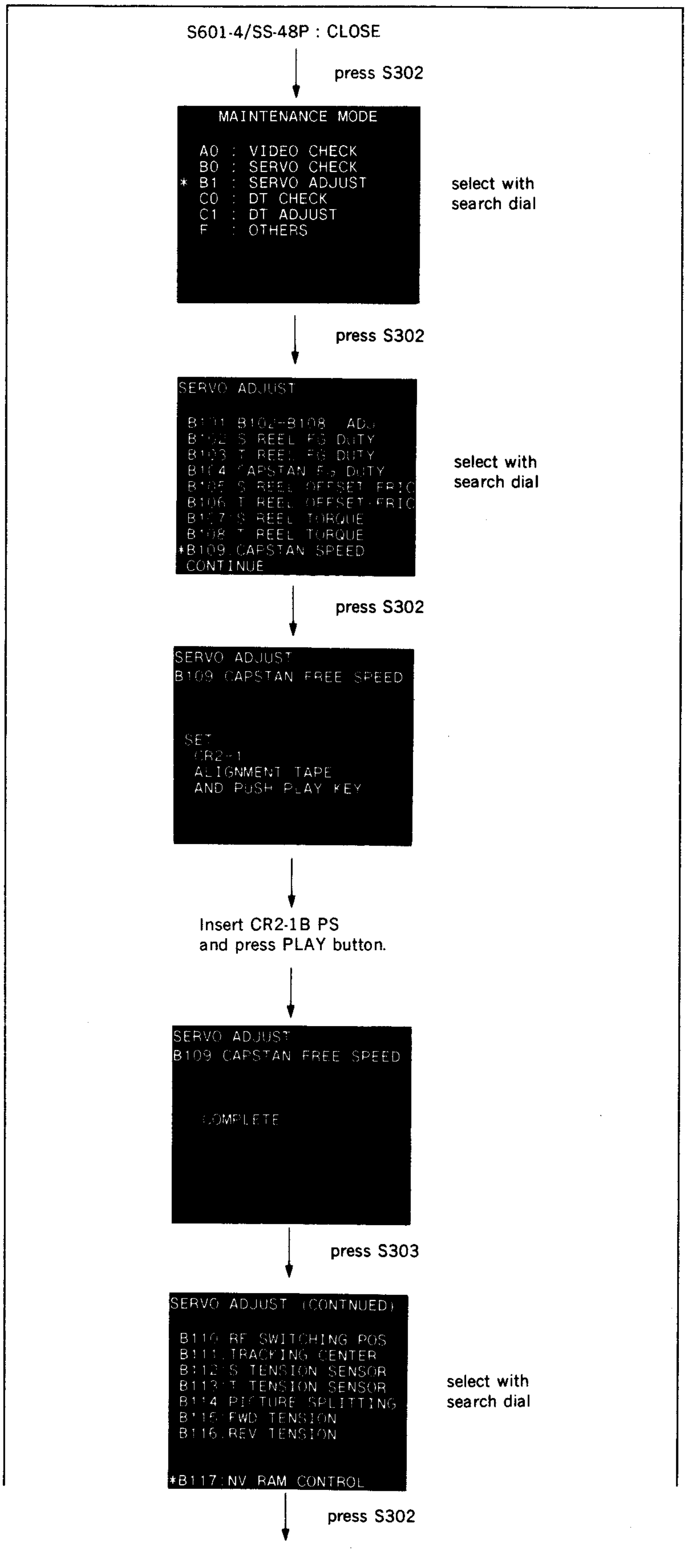
Alighnment tape CR2-1B PS : 8-960-096-51

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment dose not accept the mode other than EJECT.)
2. Put Bit4 of S601 on SS-48P board in CLOSE state. Push S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1 : SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to "B109: CAPSTAN SPEED" which is displaying on monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "CAPSTAN FREE SPEED" menu.
7. A message "SET CR2-1 ALIGNMENT TAPE AND PUSH PLAY KEY" will be displayed on the monitor screen.
8. Insert an alignment tape CR2-1B PS, and press PLAY button.
9. Confirm that the message "COMPLETE" is displayed on the monitor screen.
   When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.

Note: When "INCOMPLETE" appears on the monitor screen in step (9), press S303 on SS-48P board to return to the menu screen. Then press EJECT button and take out the alignment tape, then check if the alignment tape is CR2-1B PS.
If it is OK, check the capstan motor drive circuit (on DR-118A board) and capstan FG amplifier circuit (on SS-48P board).

10. Move ∗ mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.



S601-4/SS-48P : CLOSE

press S302

```
MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

select with search dial

press S302

```
SERVO ADJUST

 B101 B102-B108  ADJ
 B102 S REEL FG DUTY
 B103 T REEL FG DUTY
 B104 CAPSTAN FG DUTY
 B105 S REEL OFFSET FRIC
 B106 T REEL OFFSET FRIC
 B107 S REEL TORQUE
 B108 T REEL TORQUE
*B109 CAPSTAN SPEED
 CONTINUE
```

select with search dial

press S302

```
SERVO ADJUST
B109 CAPSTAN FREE SPEED


 SET
  CR2-1
  ALIGNMENT TAPE
  AND PUSH PLAY KEY
```

Insert CR2-1B PS
and press PLAY button.

```
SERVO ADJUST
B109 CAPSTAN FREE SPEED


   COMPLETE
```

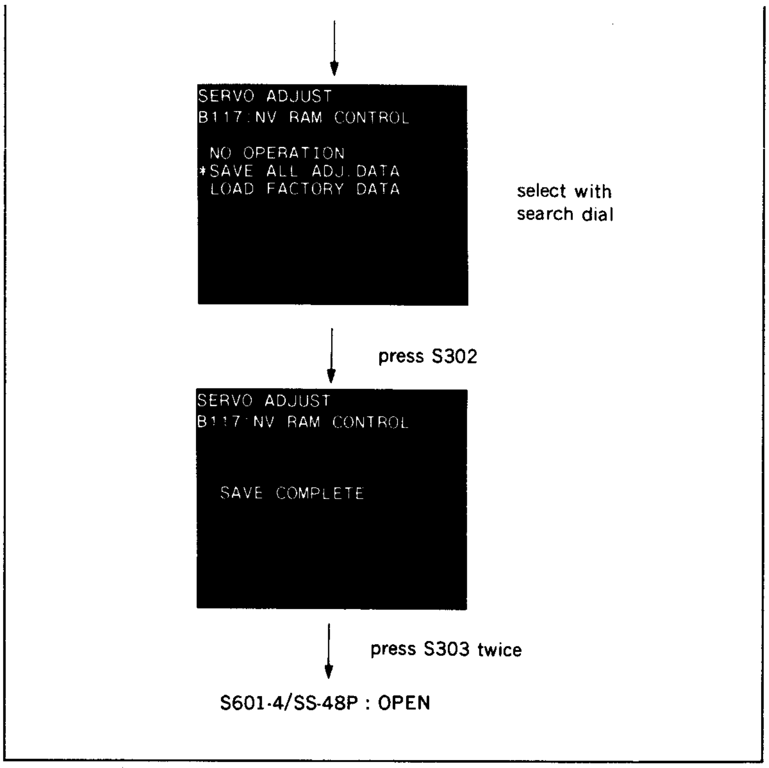
press S303

```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS
 B111 TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 PICTURE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


*B117:NV RAM CONTROL
```

select with search dial

press S302

11. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
12. Move ∗ mark to "SAVE ALL ADJ. DATA" with the search dial.
13. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
14. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.
15. Press EJECT button and take out the alignment tape.
16. Turn the POWER to OFF and put Bit4 of S601 on SS-48P board in OPEN state.


SERVO ADJUST
B117:NV RAM CONTROL
NO OPERATION
*SAVE ALL ADJ.DATA
LOAD FACTORY DATA
select with search dial
press S302
SERVO ADJUST
B117:NV RAM CONTROL
SAVE COMPLETE
press S303 twice
S601-4/SS-48P : OPEN

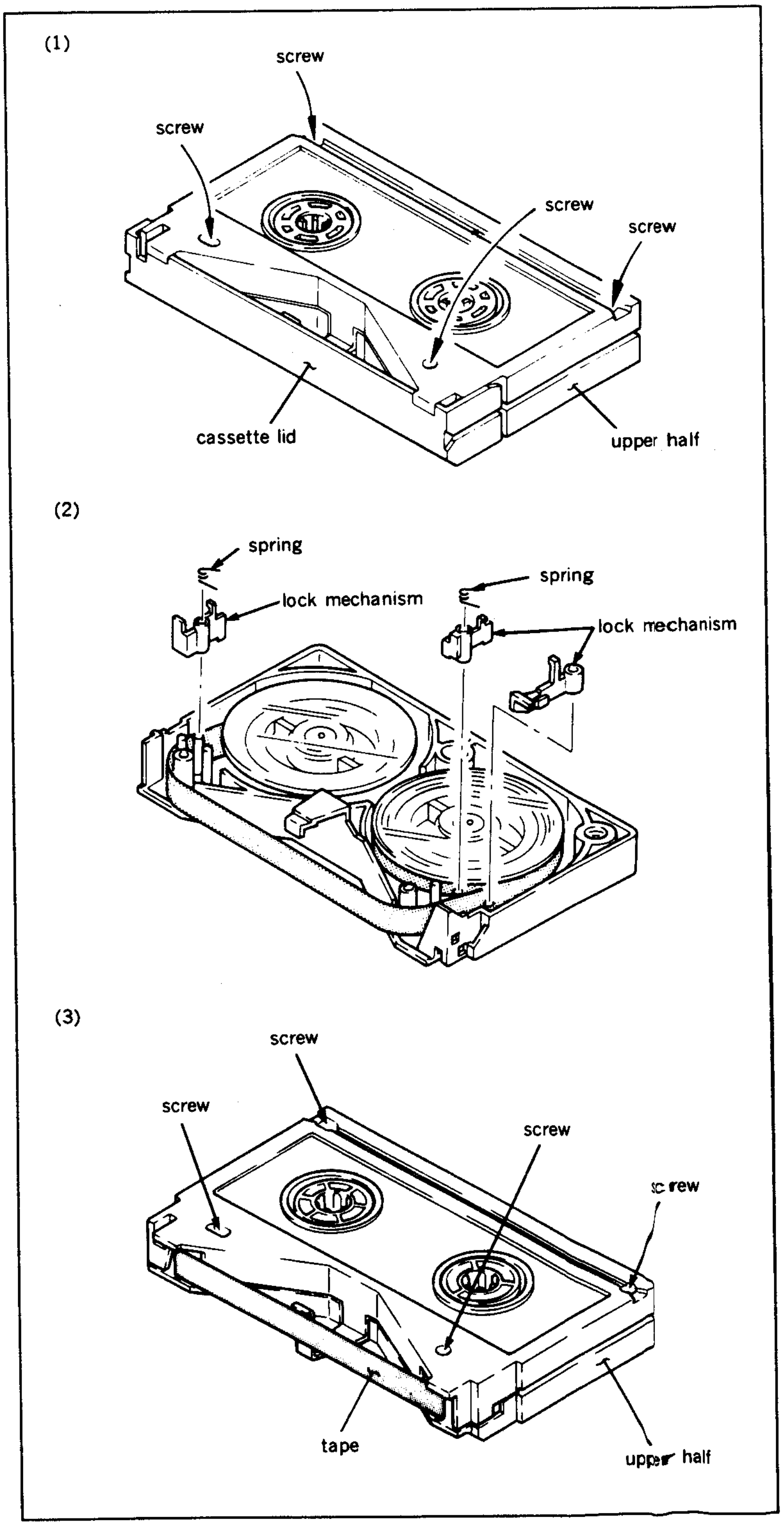
SECTION 6
TAPE RUN ALIGNMENT

6-1. GENERAL INFORMATION FOR TAPE RUN ADJUSTMENT

1. HOW TO MAKE A CASSETTE TAPE (ALIGNMENT TAPE) WITHOUT LID
   The check and adjustment cannot be performed if a cassette tape lid is installed. Remove the cassette tape lid as follows :
   (1) Remove four screws on the back of the cassette tape as shown in the figure, and remove an upper half of the cassette.
   (2) Remove the lock mechanism parts and the springs both at left and right sides, and remove the cassette lid from the upper half.
   (3) Install the upper half on the lower half with four screws from the back side.

2. ALIGNMENT TAPE
   The alignment tapes used for tape run adjustment are as follows :

   CR2-1B PS : 8-960-096-51
   CR5-2A PS : 8-960-098-44
   CR8-1A PS : 8-960-098-45


(1)
screw
screw
screw
screw
cassette lid
upper half
(2)
spring
lock mechanism
spring
lock mechanism
(3)
screw
screw
screw
screw
tape
upper half

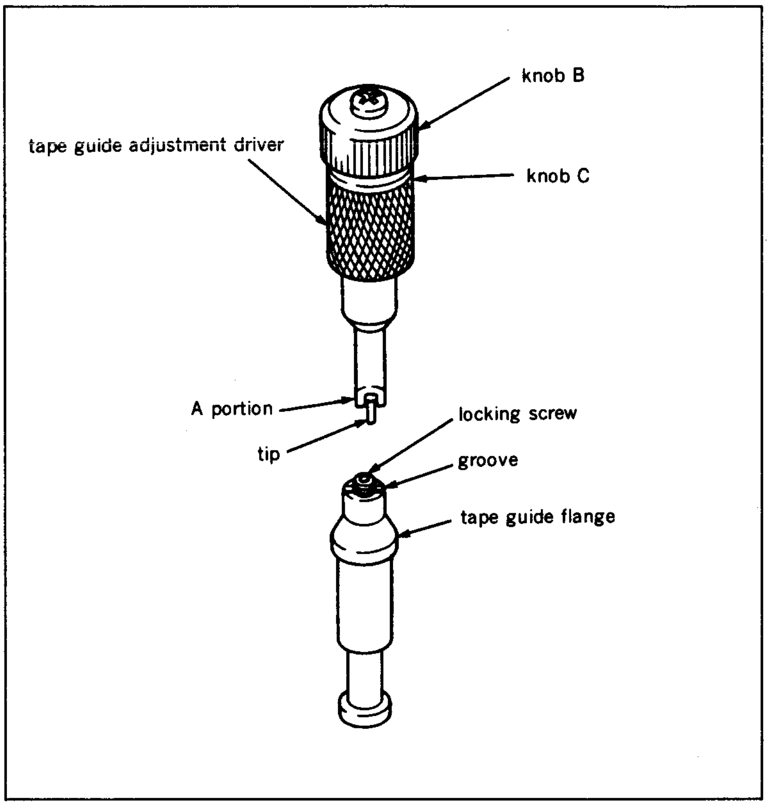
3. TAPE GUIDE ADJUSTMENT DRIVER

During tracking adjustment, rotate the flange on the tape guide in order to obtain the most desirable tape path. At that time, use the tape guide adjustment driver.

Tape guide adjustment driver : J-6321-500-A

Here is the explanation about how to use the tape guide adjustment driver.

(1) Align A portion (flatblade) with the groove of the tape guide flange.
(2) Fix knob C, rotate knob B, and loosen locking screw.
(3) Align the tip of knob B with the hole of locking screw of the tape guide. Fix knob B and rotate knob C. Then, the upper flange of the tape guide is rotated.
(4) In order to tighten the locking screw of the tape guide flange, firstly, fix the knob C, then rotate the knob B. (Tightening torque: 9.8 to 11.7 N•cm {1.0 to 1.2 kgf• cm})



4. CASSETTE COMPARTMENT

Install the cassette compartment in the unit before performing the tape run adjustment. This enables more accurate adjustment.

5. REQUIRED OPERATION TO REMOVE RESIDUAL DISTORTION FROM DT HEAD BEFORE ATTEMPRING VIDEO TRACKING ADJUSTMENT

Since this machine is equipped with DT (dynamic tracking) play back function, video head is mounted on bimorph substrate. The bimorph substrate has the nature to bent itself depending upon the amount of voltage output from control circuit, during variable playback mode. Due to his nature. there can be some residual distortion left in the bimorph, in some timings of POWER OFF.

This residual distortion has no adverse effect in normal playback operation. But, when attempting the video tracking adjustment that has serious effect on tape-to-tape interchangebility. the DT video head shuold be positioned in mechanical default position.

Before attempting video tracking adjustment, be sure to remove the residual distortion from DT head, by foolowing procedure below.

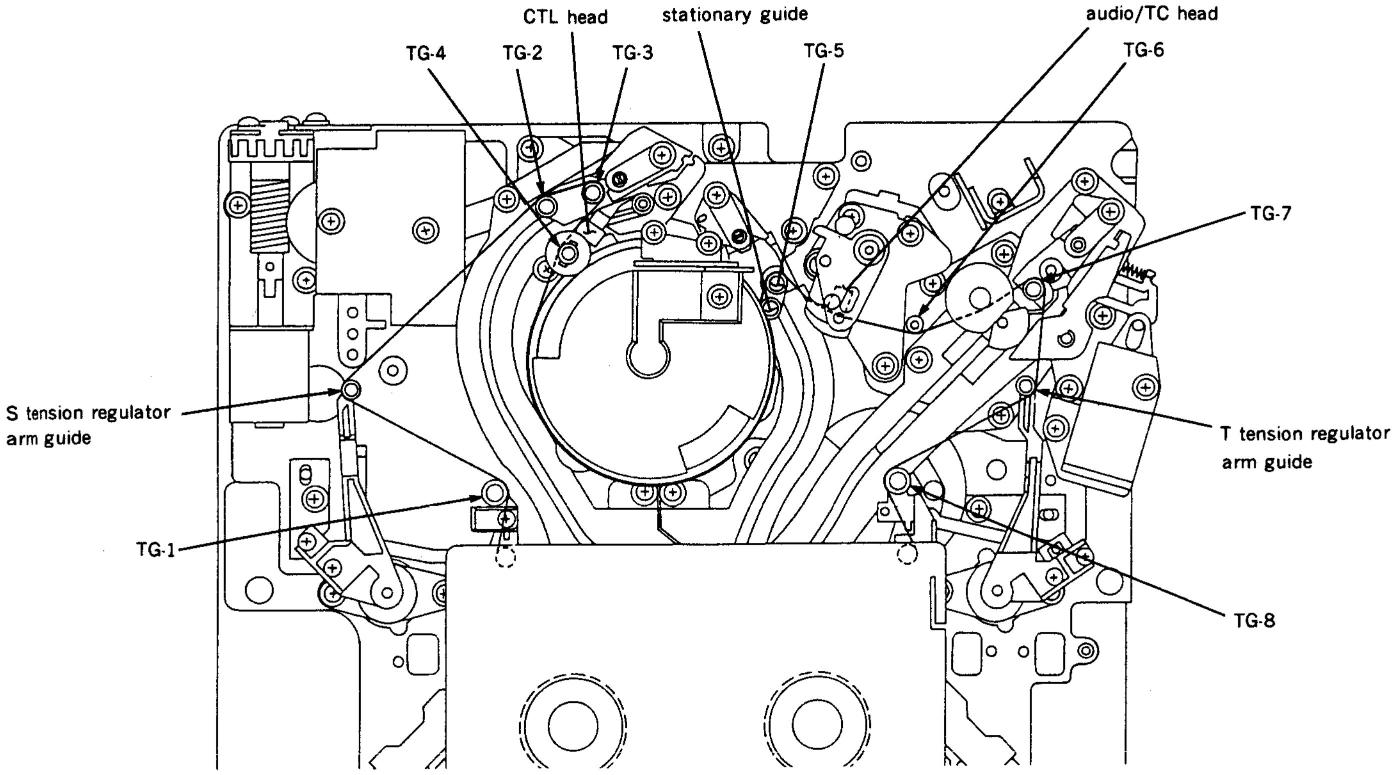
Before attempting this operation, perform DT head distortion waveform adjustment according to the electrical alignment.

(1) Turn POWER to OFF.

(2) Set Bits 1, 2 and 5 of S2 on DT-30 (B-1) board to ON state respectively.
(3) Turn POWER to ON.
(4) Press EJECT button to put the unit into EJECT mode.
(5) Press S1 on DT-30 board (A-1) (entering the distortion removal mode), and make sure that red LED D10 on DT-30 board (A-1) lights ON about 22 seconds.
(6) After the LED turns OFF, turn POWER to OFF.
(7) Reset Bits 1, 2 and 5 of S2 on DT-30 board to OFF state.

6. LOCATION OF HEADS AND TAPE GUIDES

The location of heads and tape guides listed up in the adjustment item is shown in the figure.


CTL head
stationary guide
audio/TC head
TG-4
TG-2
TG-3
TG-5
TG-6
TG-7
S tension regulator arm guide
T tension regulator arm guide
TG-1
TG-8

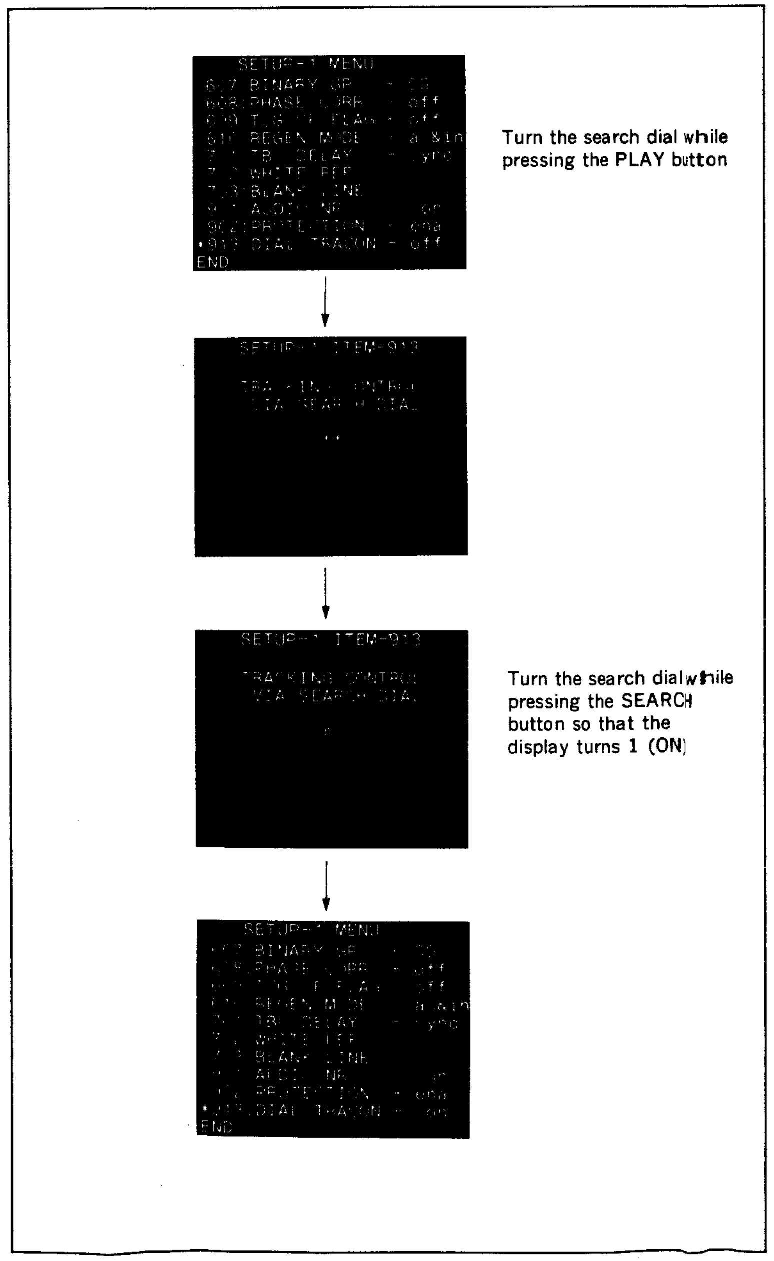
7. PROCEDURE TO OPERATE THE TRACKING CONTROL IN DT MODE

Since this machine is DT player, it has not TRACKING control knob on the front control panel.
The manual tracking control function is not needed because the DT player has its inherent function. But the manual tracking control is required during in the video tracking adjustment.
For this purpose, SETUP MENU has the special item that serves for this adjustment.
Use the search dial to operate the tracking control function.
Practical procedures are described as follows.
After completion of adjustment, be sure to return all the settings to the factory shipment conditions.

(Setting procedures)
(1) Set Bitl of S2 on SS-48P board to ON (CLOSE) state.
(2) Press the MENU button of SYSTEM SETUP on the sub-control panel to enter the SETUP MENU mode.
(3) While pressing PLAY button, rotate search dial to select the ITEM-913.
(4) While pressing SEARCH button, rotate search dial to obtain the data of 1 (ON).
(5) Press the SET button of SYSTEM SET-UP on the sub-control panel to memorize the data into NOV RAM.

(Operating procedures)
∗ TRACKING control FIX position
When the search dial is in the STILL position of SHUTTLE mode.
∗ Tracking control function
Rotate the search dial clockwise or counterclockwise in SHUTTLE mode. It gives the same function as TRACKING control.

(Procedure to exit from the manual tracking mode)
(6) Press the MENU button of SYSTEM SETUP on the sub-control panel to enter the SETUP MENU mode.
(7) While pressing PLAY button, rotate search dial to select the ITEM-913.
(8) While pressing SEARCH button, rotate search dial to obtain the data of 0 (OFF).
(9) Press the SET button of SYSTEM SET-UP on the sub-control panel to memorize the data into NOV RAM.


SETUP-1 MENU
BINARY GP
PHASE CORR - off
REGEN MODE
TB DELAY
WHITE REF
BLANK LINE
PROTECTION
•913 DIAL TRACON - off
END
SETUP-1 ITEM-913
TRACKING CONTROL
VIA SEARCH DIAL

Turn the search dial while pressing the PLAY button

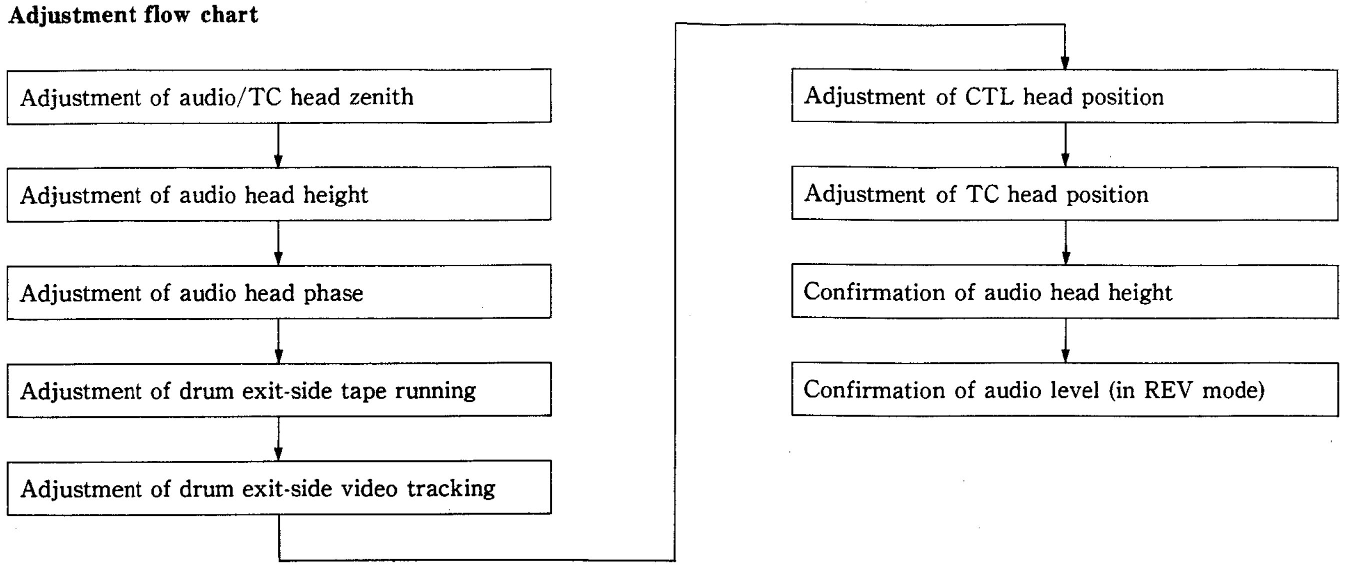
Turn the search dial while pressing the SEARCH button so that the display turns 1 (ON)

6-2. AUDIO/TC HEAD ZENITH ADJUSTMENT

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Flatness plate	: J-6086-570-A

Adjustment flow chart


Adjustment of audio/TC head zenith
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of drum exit-side tape running
Adjustment of drum exit-side video tracking
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio level (in REV mode)

Check

1. Put the unit into unthreading end mode.
2. Place the flatness plate to a TG-6 tape guide, then push it lightly against an audio/TC head.

Note : Pay particular attention not to scratch the tape contacting surface of the audio/TC head.

3. While pressing the flatness plate against the TG-6 tape guide with finger, push the upper part of the flatness plate in front of the audio/TC head softly with fingers of the other hand. Then, push the lower part of the flatness plate in front of the audio/TC head softly with fingers of the other hand.

Specification : The flatness plate must not move when pushed the upper part. (In other words, no clearance shall exist between the flatness plate and head.)

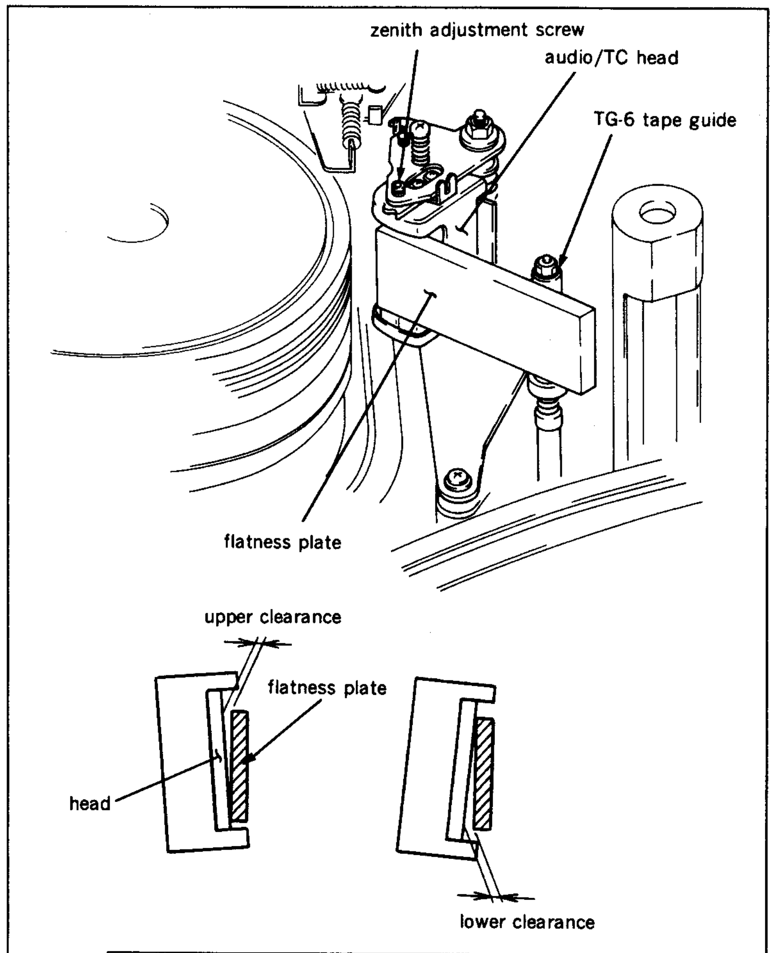
The flatness plate must not move or a little move when pushed the lower part.

The clearance between the flatness plate and head (moving distance) is acceptable less than 0.05 mm.

- The confirmation procedure of 0.05 mm clearance :

(1) Turn the zenith adjustment screw in counterclockwise so that the flatness plate must not move when pushed the upper and lower parts.

(2) Turn the zenith adjustment screw in clockwise 50 degrees, the 0.05 mm clearance between the flatness plate and head exists.


zenith adjustment screw
audio/TC head
TG-6 tape guide
flatness plate
upper clearance
flatness plate
head
lower clearance

Spec. : Upper clearance must not exist.
Lower clearance is acceptable less than 0.05 mm.

If the specification is satisfied, perform steps (5) and later.

If the specification is not satisfied, perform steps (4) and later.

Adjustment

4. In case clearance is observed at lower part, turn the zenith adjustment screw in counterclockwise to satisfy the above specification. In case clearance is observed at upper part, turn the zenith adjustment screw in clockwise to satisfy the above specification.
5. Clean the audio/TC head and TG-6 tape guide with a cleaning piece moistened with cleaning fluid.
6. Perform audio head height adjustment. (Refer to Section 6-7.)
7. Perform audio head phase adjustment. (Refer to Section 6-8.)
8. Perform drum exit-side tape running adjustment. (Refer to Section 6-3.)
9. Perform drum exit-side video tracking adjustment. (Refer to Section 6-4.)
10. Perform CTL head position adjustment. (Refer to Section 6-6.)
11. Perform TC head position adjustment. (Refer to Section 6-10.)

12. Perform reconfirmation of audio head height. (Refer to steps (1) through (3) in Section 6-7.)
13. Perform confirmation of audio level (in REV mode). (Refer to steps (1) through (4) in Section 6-11.)

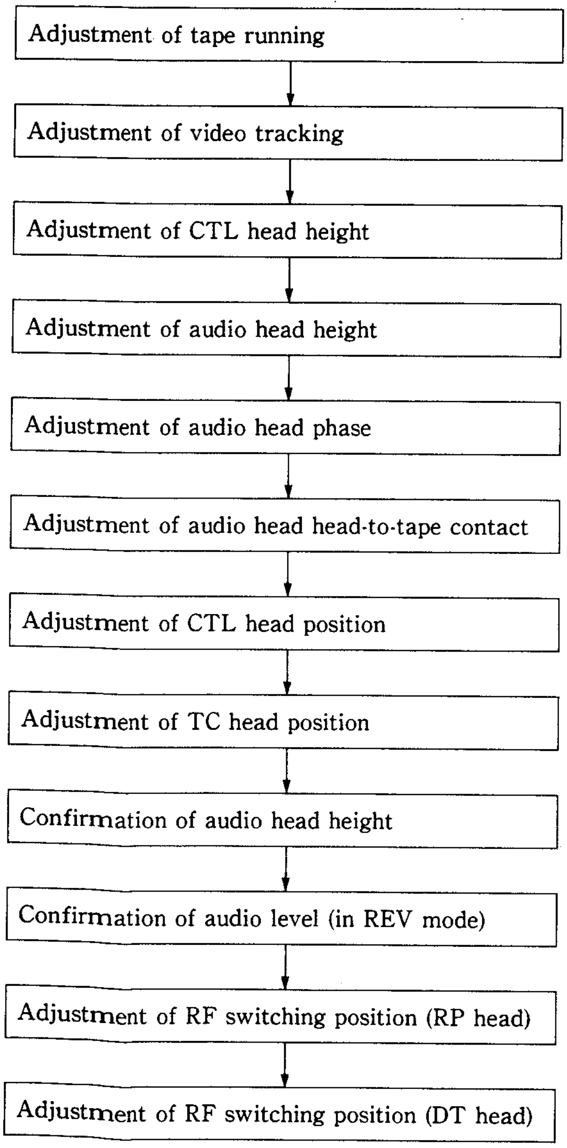
6-3. TAPE RUNNING ADJUSTMENT

- Adjustment of tape run is extremely important and critical adjustment for the purpose of running the tape in the most appropriate state. If this adjustment is not adequate, there is a possibility to damage the tape or cause serious damage to the unit.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit. By this way, accurate adjustment will be possible without difficulty as a service operation.

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Tape guide adjustment driver	: J-6321-500-A
Adjustment mirror	: J-6080-029-A
Oxide tape without lid (BCT-30G)	
Metal tape without lid (BCT-90ML)	

Adjustment flow chart


Adjustment of tape running
Adjustment of video tracking
Adjustment of CTL head height
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of audio head head-to-tape contact
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio level (in REV mode)
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)

Check

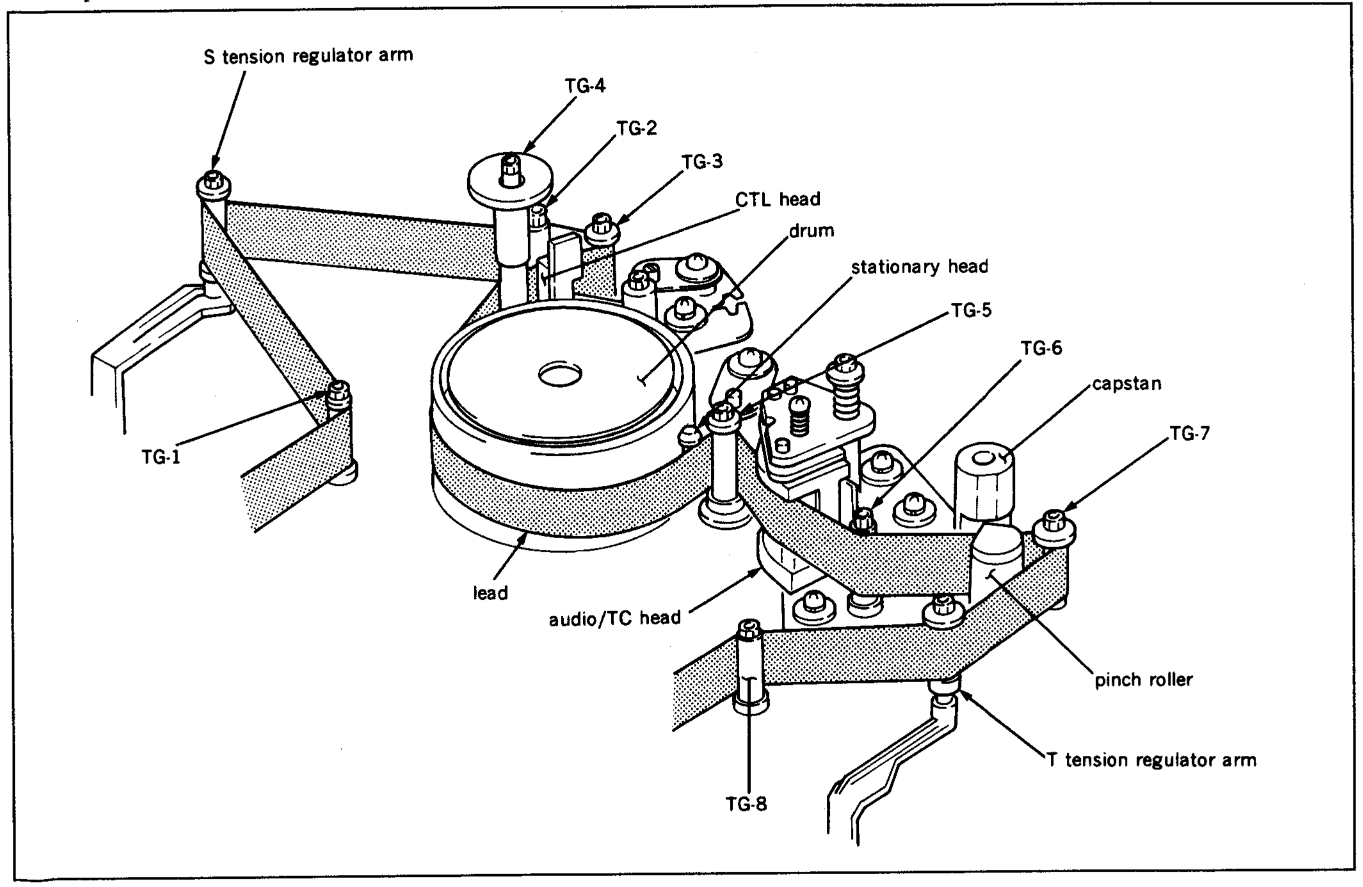
1. Clean the tape running surface of the tape guides, drum and video heads with a cleaning piece moistened with cleaning fluid.
2. Insert an oxide tape without lid (BCT-30G) into the unit.
3. Put the unit into PLAY mode.
4. Make sure using the adjustment mirror that the tape running condition satisfies the specification.
5. Put the unit into REV X1 mode.
6. Make sure using the adjustment mirror that the tape running condition satisfies the specification.
7. Put the unit into FWD X5 and F.FWD modes.
8. Make sure using the adjustment mirror that the tape running condition satisfies the specification.
9. Put the unit into REV X5 and REW modes.
10. Make sure using the adjustment mirror that the tape running condition satisfies the specification.
11. Make sure that the specification is satisfied when the unit is changed from STOP mode to F.FWD mode, STOP mode to REW mode, STOP mode to PLAY mode, STOP mode to FWD X5 mode, or STOP mode to REV X5 mode.
12. Press the EJECT button, take out the oxide tape without lid (BCT-30G), and insert the metal particle tape without lid (BCT-90ML) into the unit.
13. Perform steps (3) through (11) and confirm that the specifications are satisfied.

Adjustment

14. Loosen the locking screw at the upper part of the tape guide that does not satisfy the specification two to three turns using the tape guide adjustment driver.
15. Turn the adjustment nut or the upper flange of the tape guide, and adjust the height of the tape guide so that the specification is satisfied. Tighten the locking screw after adjustment is completed.

Note : The specification may not be satisfied by the above adjustment when an S slider assembly or T slider assembly is replaced. In this case, turn the slantness adjustment screw for the S slider assembly or T slider assembly in accordance with the procedure described in the video tracking adjustment. (Refer to Section 6-4-2 or 6-4-3.)

16. Perform video tracking adjustment.
    (Refer to Section 6-4.)
17. Perform CTL head height adjustment.
    (Refer to Section 6-5.)
18. Perform audio head height adjustment.
    (Refer to Section 6-7.)
19. Perform audio head phase adjustment.
    (Refer to Section 6-8.)
20. Perform audio head head-to-tape contact adjustment.
    (Refer to Section 6-9.)



21. Perform CTL head position adjustment.
    (Refer to Section 6-6.)
22. Perform TC head position adjustment.
    (Refer to Section 6-10.)
23. Perform reconfirmation of audio head height.
    (Refer to steps (1) through (3) in Section 6-7.)
24. Perform confirmation of audio level (in REV mode).
    (Refer to steps (1) through (4) in Section 6-11.)
25. Perform RF switching position (RP head) adjustment.
    (Refer to Section 6-12.)
26. Perform RF switching position (DT head) adjustment.
    (Refer to Section 6-13.)

Specification

Drum entrance side

1) The tape runs in contact with the lead of drum entrance side without any curl.
2) The upper edge of the tape runs in contact with the upper flange of the TG-3 tape guide.
   (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
3) The lower edge of the tape runs in contact with the lower flange of the TG-2 tape guide.
   When the unit just put into the REV mode, the lower edge of the tape runs in contact with the lower flange without curl.
   (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
4) The tape runs in the center of the guide roller of the S tension arm.
   (In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)
5) There shall be no uneven tape tension in the area between the TG-4 and TG-3, the TG-2 and guide roller of S tension arm, and the guide roller of S tension arm and TG-1.

Drum exit side

6) The tape runs in contact with the lead of drum exit side without any curl.
7) The upper edge of the tape runs in contact with the upper flange of the TG-5 tape guide.
   (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
8) The lower edge of the tape runs in contact with the lower flange of the TG-6 tape guide.
   However, in PLAY, F.FWD, and REW modes, the lower flange of the tape guide must not rotate.
   (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
9) The upper edge of the tape runs in contact with the upper flange of the TG-7 tape guide.
   (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
10) The tape runs in the center of the guide roller of the T tension arm.
    (In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)
11) There shall be no uneven tape tension in the area between the TG-5 and TG-6, the TG-6 and capstan shaft, the capstan shaft and TG-7, the TG-7 and guide roller of T tension arm, and the guide roller of T tension arm and TG-8.

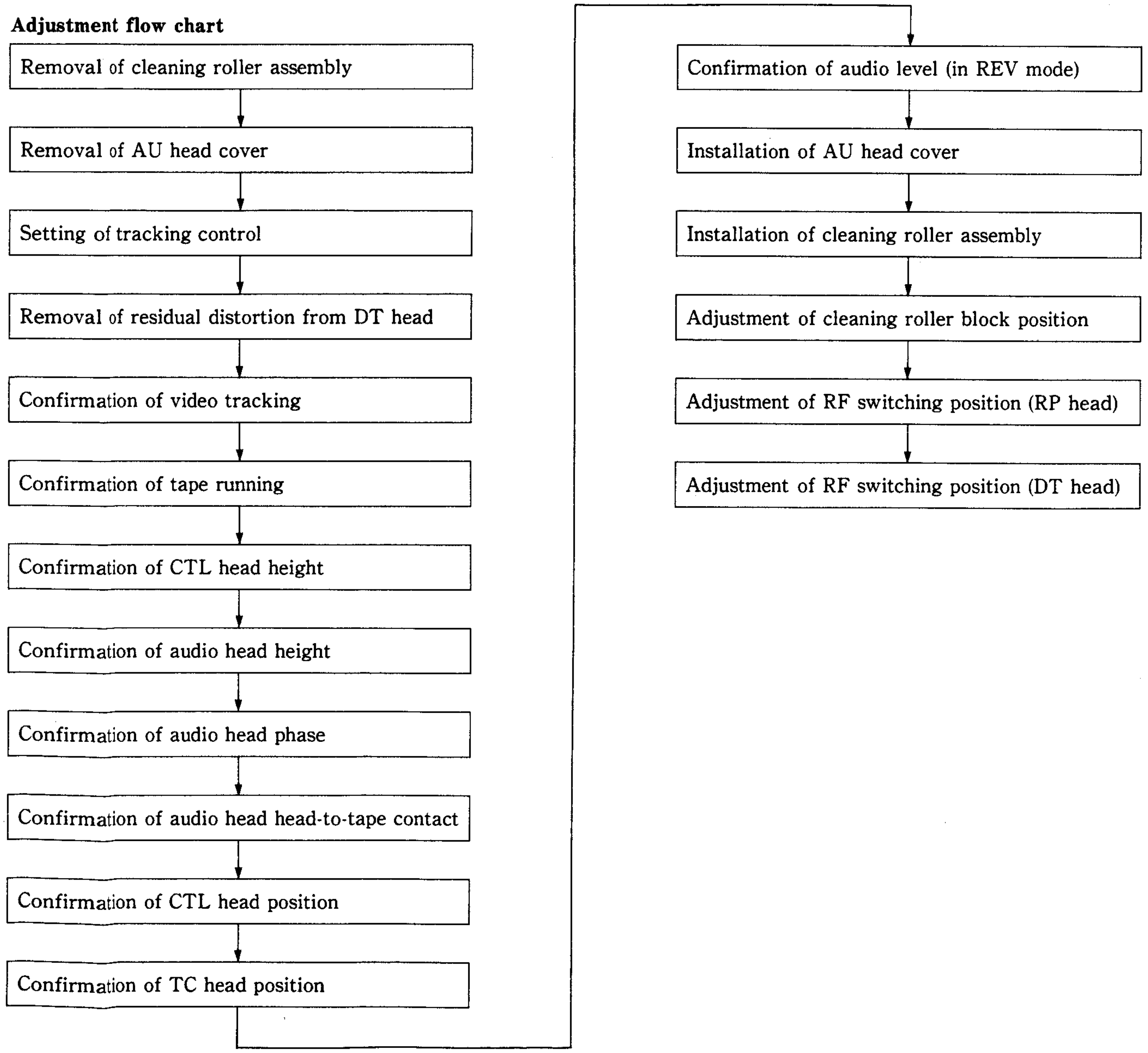
6-4. CONFIRMATION OF VIDEO TRACKING

- Adjustment of video tracking is extremely important. If this adjustment is not adequate, the tape interchangeability is influenced significantly.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit. By this way, accurate adjustment will be possible without difficulty as a service operation.

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Alignment tape without lid (CR2-1B PS)	: 8-960-096-51
Adjustment mirror	: J-6080-029-A
Dualtrace oscilloscope	

Adjustment flow chart

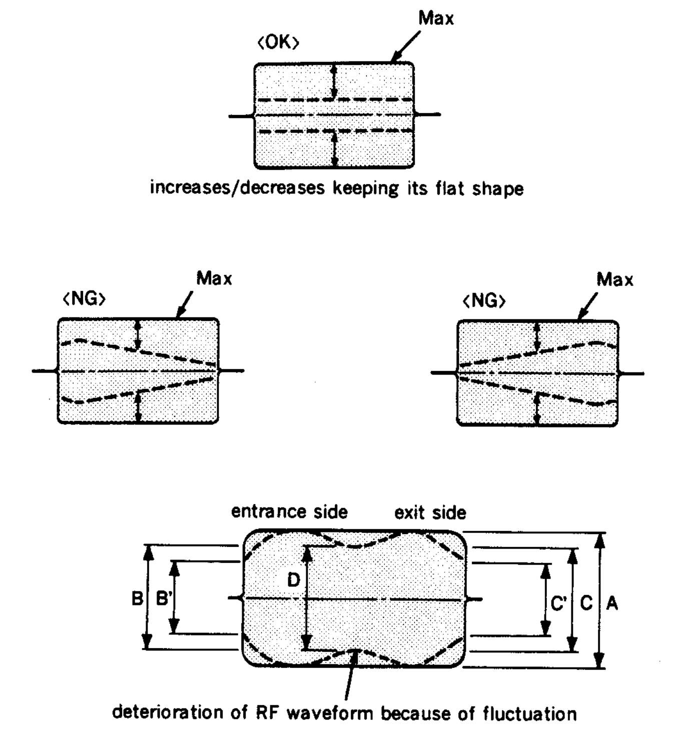

Removal of cleaning roller assembly
Removal of AU head cover
Setting of tracking control
Removal of residual distortion from DT head
Confirmation of video tracking
Confirmation of tape running
Confirmation of CTL head height
Confirmation of audio head height
Confirmation of audio head phase
Confirmation of audio head head-to-tape contact
Confirmation of CTL head position
Confirmation of TC head position
Confirmation of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)

Preparation

1. Remove a cleaning roller assembly. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. (Refer to step (3) in Section 5-3.)
3. Set ITEM 913 of SETUP MENU to 1 (ON) using a search dial that can operate as a tracking control according to item 7 in Section 6-1.
4. Remove residual distortion from DT head. (Refer to item 5 in Section 6-1.)
5. Put Bi 3 of S2 (B-1) on DT-30 board in COLOSE (ON) state.

Check

1. Clean the tape running surface of the tape guides, drum, and video heads with a cleaning piece moistened with cleaning fluid.
2. Connect the oscilloscope as follows.
   CH-1 : TP101/VP-33BP board
   (Address : Side A, D-1) (Y-RF signal)
   CH-2 : TP1/VP-33BP board
   (Address : Side A, D-1) (Switching pulse)
   TRIG : CH-2
3. Insert an alignment tape without lid (CR2-1B PS) into the unit and put the unit into PLAY mode.
4. Make sure that the RF envelope waveform increases/decreases keeping its flat shape when the search dial is turned.
5. Make sure that the head-to-tape contact waveform and fluctuation satisfy the required specifications when the RF envelope waveform is maximized by turning the search dial.
6. Reset ITEM 913 of SETUP MENU to 0 (OFF). (Refer to item 7 in Section 6-1.)


〈OK〉
Max
increases/decreases keeping its flat shape
〈NG〉
Max
〈NG〉
Max
entrance side
exit side
B
B'
D
C'
C
A
deterioration of RF waveform because of fluctuation

A : maximum output level
D : minimum output level at center portion because of fluctuation
C, B : maximum output level at entrance and exit sides
C', B' : minimum output level at entrance and exit sides because of fluctuation

$\frac{B}{A} \geq 0.8$

$\frac{C}{A} \geq 0.8$

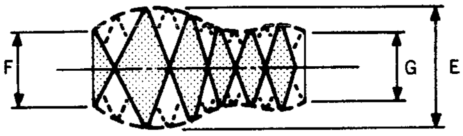
$\frac{D}{A} \geq 0.9$

$\frac{B'}{B} \geq 0.9$

$\frac{C'}{C} \geq 0.9$

7. Put the unit into REV X1 mode.
8. Make sure that the head-to-tape contact waveform satisfies the specifications.
9. Put the unit into REW and F.FWD modes, and change the mode from STOP to F.FWD modes, and from STOP to REW modes. At that time, make sure that no head-to-tape contact waveform lacking exists in the RF envelope waveform.
   If the specification is satisfied, perform steps ⑽ and later.
   If the specification is not satisfied, perform the adjustment in accordance with Section 6-4-1, 6-4-2, or 6-4-3.
10. Make sure that the tape running state in each tape guide satisfy the specification.
    (Refer to steps (1) through ⒀ in Section 6-3.)
11. Perform CTL head height confirmation.
    (Refer to steps (1) through (3) in Section 6-5.)
12. Perform audio head height confirmation.
    (Refer to steps (1) through (3) in Section 6-7.)
13. Perform audio head phase confirmation.
    (Refer to steps (1) through (4) in Section 6-8.)
14. Perform audio head head-to-tape contact confirmation. (Refer to steps (1) through (4) in Section 6-9.)
15. Perform CTL head position confirmation.
    (Refer to steps (1) through (3) in Section 6-6.)
16. Perform TC head position confirmation.
    (Refer to steps (1) through (3) in Section 6-10.)
17. Put Bit 3 of S2 (B-1) on DT-30 board in OPEN (OFF) state.
18. Perform confirmation of audio level (in REV mode). (Refer to steps (1) through (4) in Section 6-11.)
19. Install the AU head cover. (Refer to step ⒇ in Section 5-3.)
20. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
21. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
22. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
23. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)
24. Reset ITEM 913 to 0 (OFF). (Refer to item 7 in Section 6-1.)

<In REV mode>



$\frac{F}{E} \geqq 0.8$

$\frac{G}{E} \geqq 0.8$

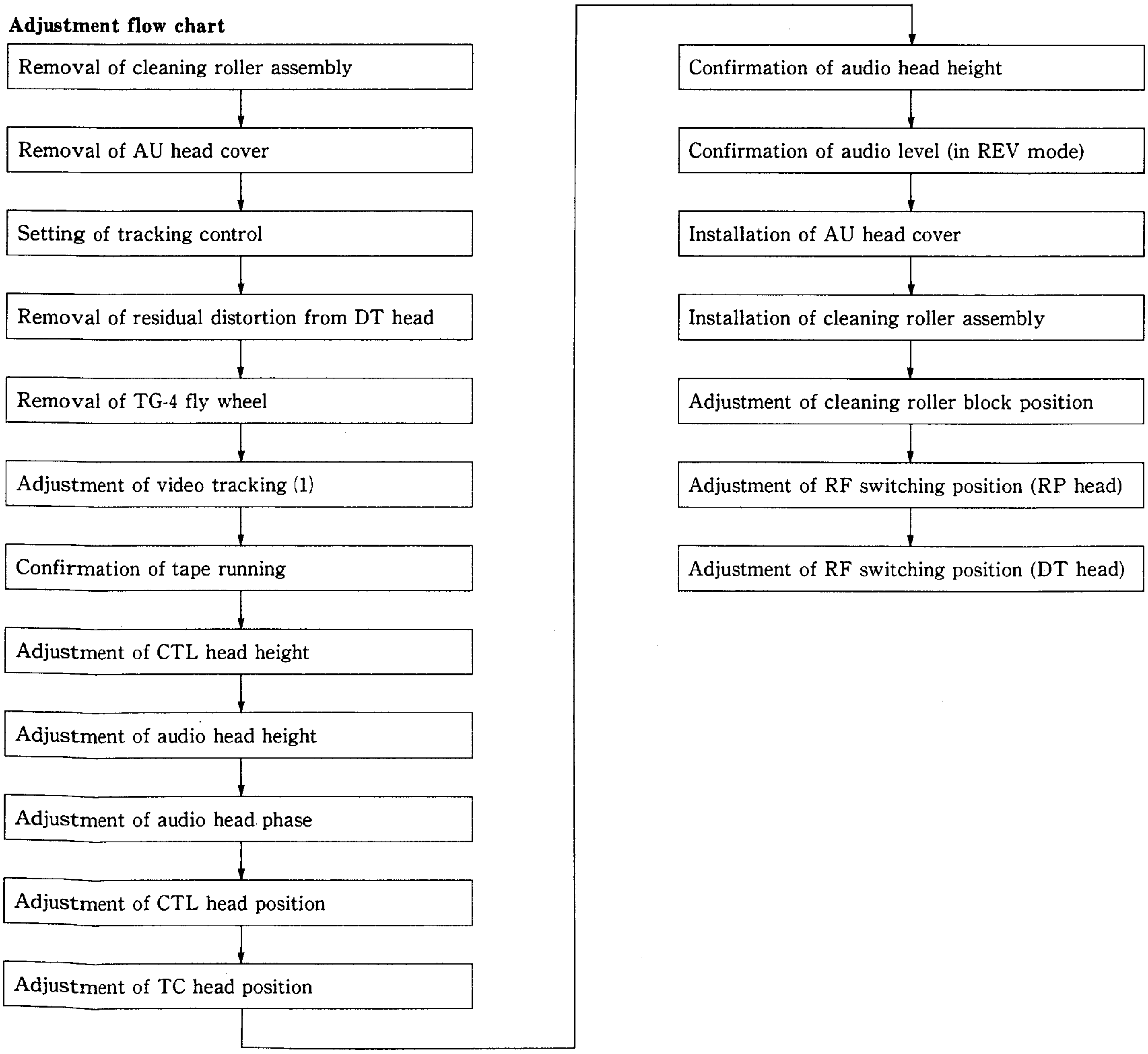
6-4-1. Video Tracking Adjustment (1)

- Adjustment of video tracking is extremely important. If this adjustment is not adequate, the tape interchangeability is influenced significantly.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit. By this way, accurate adjustment will be possible without difficulty as a service operation.

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Alignment tape without lid (CR2-1B PS)	: 8-960-096-51
Tape guide adjustment driver	: J-6321-500-A
Adjustment mirror	: J-6080-029-A
Dualtrace oscilloscope	

Adjustment flow chart


Removal of cleaning roller assembly
Removal of AU head cover
Setting of tracking control
Removal of residual distortion from DT head
Removal of TG-4 fly wheel
Adjustment of video tracking (1)
Confirmation of tape running
Adjustment of CTL head height
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)

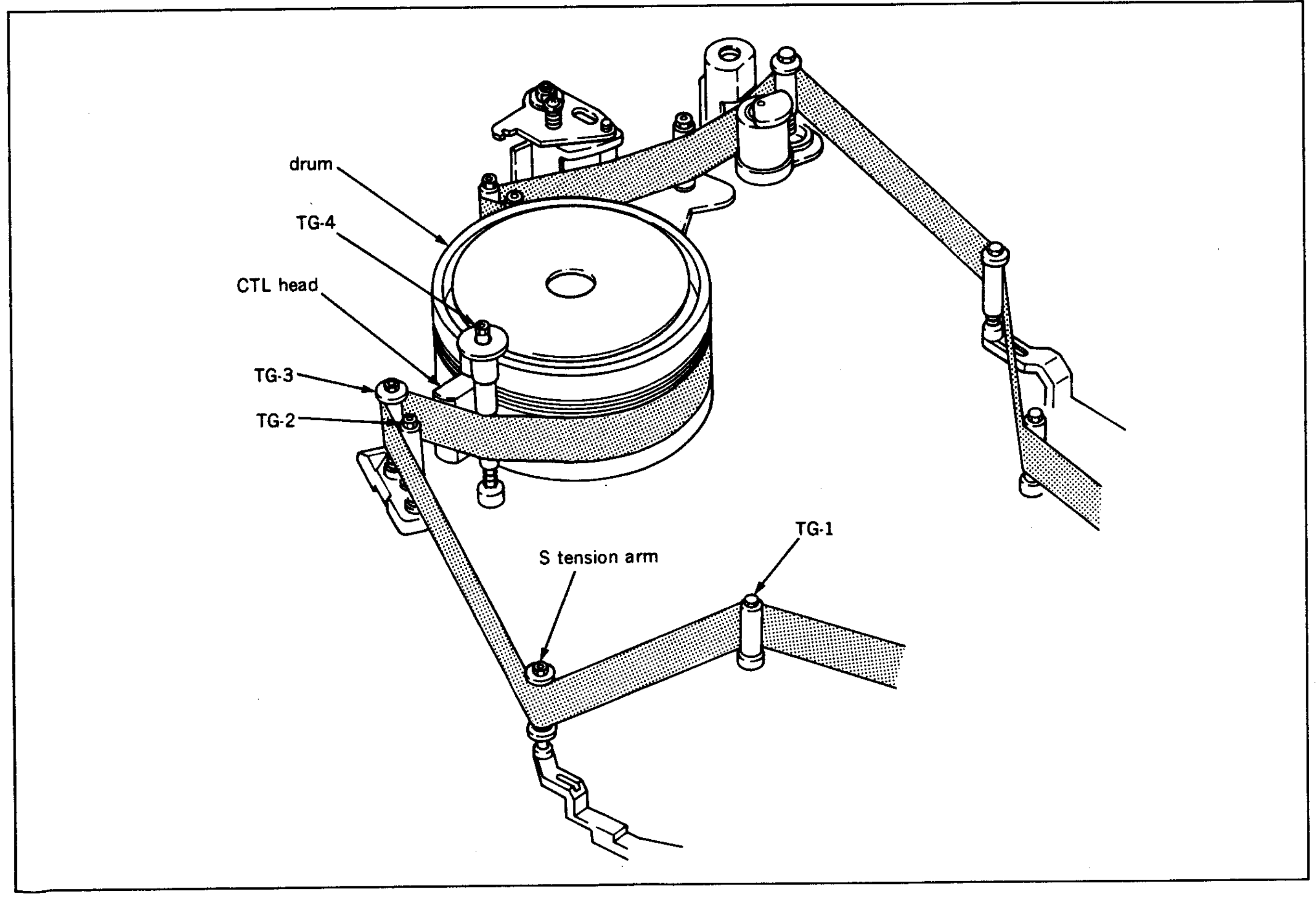
Preparation

1. Remove a cleaning roller assembly. (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover. (Refer to step (3) in Section 5-3.)
3. Set ITEM 913 of SETUP MENU to 1 (ON) using a search dial that can operate as a tracking control according to item7 in Section 6-1.
4. Remove residual distortion from DT head. (Refer to item 5 in Section 6-1.)
5. Put Bit 3 of S2 (B-1) on DT-30 board in CLOSE (ON) state.

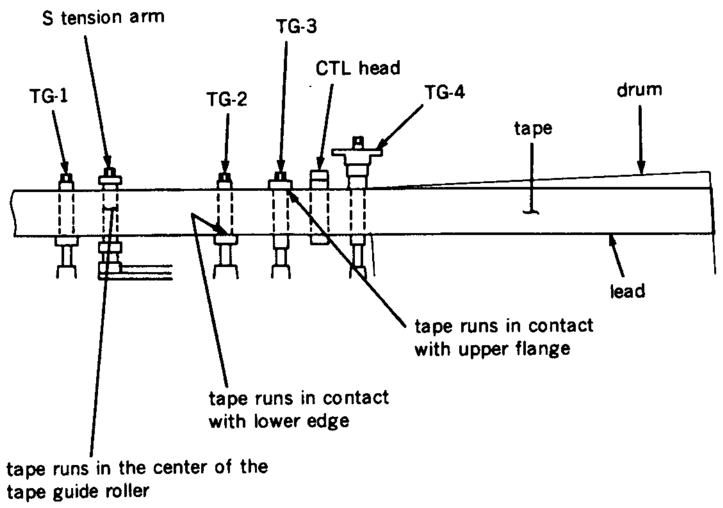
Adjustment

- **Perform steps (1) through (16), and steps (33) and later when performing the tracking adjustment on the drum entrance side.**
- **Perform steps (1) and (2), and steps (17) and later when performing the tracking adjustment on the drum exit side.**

1. Clean the tape running surface of the tape guides, drum, and video heads with a cleaning piece moistened with cleaning fluid.
2. Connect the oscilloscope as follows.
   CH-1 : TP101/VP-33BP board
   (Address : Side A, D-1) (Y-RF signal)
   CH-2 : TP1/VP-33BP board
   (Address : Side A, D-1) (Switching pulse)
   TRIG : CH-2
3. Hold claws of the upper part of a TG-4 tape guide roller using tweezers, and remove a fly wheel. (Refer to Section 5-2.)
4. Loosen the locking screws at the upper part of TG-3 and TG-2 tape guide rollers one to two turns using a tape guide adjustment driver.
5. Insert an alignment tape CR2-1B PS and put the unit into PLAY mode.
6. Turn the search dial so that the RF envelope waveform is 70 % to 80 % of the maximum output.
7. Turn the adjustment nut of the TG-2 tape guide so that the lower flange of the TG-2 tape guide does not come in contact with the lower edge of the tape.
8. Turn the upper flange of the TG-3 tape guide so that the RF envelope waveform on the entrance side is flat.
9. Turn the adjustment nut of the TG-2 tape guide so that the lower flange of the TG-2 tape guide comes in contact with the lower edge of the tape.

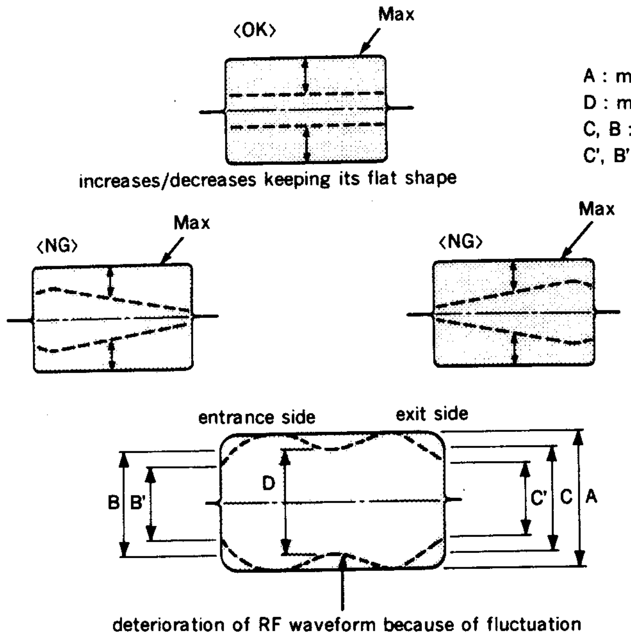

drum
TG-4
CTL head
TG-3
TG-2
S tension arm
TG-1

10. Turn the search dial so that the RF envelope waveform is the maximum output.
    Make sure that the head-to-tape contact of the RF envelope waveform on the drum entrance side and the fluctuation satisfy the specification. Make sure that no tape curl to occur at the tape guide flanges of the TG-2 and TG-3 using an adjustment mirror.
    (If tape curl can not be removed, it is acceptable as far as the maximum limit shown in the figure.)
11. Reset ITEM 913 of SETUP MENU to 0 (OFF).
    (Refer to item 7 in Section 6-1.)


S tension arm
TG-3
CTL head
TG-1
TG-2
TG-4
drum
tape
lead
tape runs in contact
with upper flange
tape runs in contact
with lower edge
tape runs in the center of the
tape guide roller

Specifications

- The upper edge of the tape runs in contact with the upper flange of the TG-3 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The lower edge of the tape runs in contact with the lower flange of the TG-2 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The tape runs in the center of the guide roller of the S tension arm.
  (In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)


⟨OK⟩
Max
increases/decreases keeping its flat shape
⟨NG⟩
Max
⟨NG⟩
Max
entrance side
exit side
B
B'
D
C'
C
A
deterioration of RF waveform because of fluctuation

A : maximum output level
D : minimum output level at center portion because of fluctuation
C, B : maximum output level at entrance and exit sides.
C', B' : minimum output level at entrance and exit sides because of fluctuation

$\frac{B}{A} \geqq 0.8$

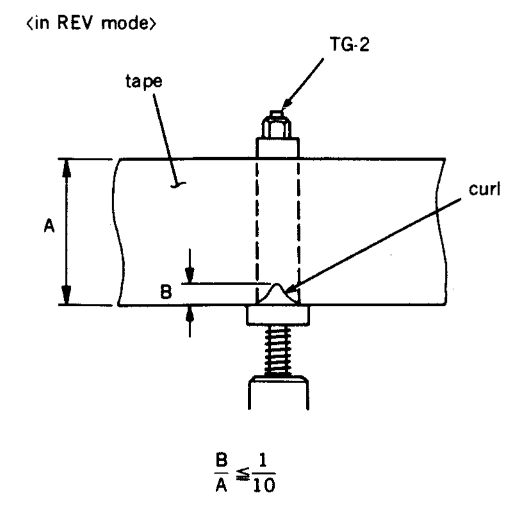
$\frac{C}{A} \geqq 0.8$

$\frac{D}{A} \geqq 0.9$

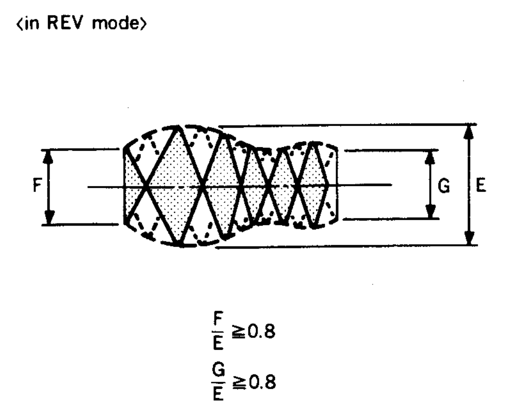
$\frac{B'}{B} \geqq 0.9$

$\frac{C'}{C} \geqq 0.9$

12. Put the unit into REV X1 mode.
    At that time, make sure that the tape curl at the lower flange of the TG-2 tape guide satisfies the specification below.
    Specification : No tape curl to occur at the lower flange.
    (If tape curl can not be removed, it is acceptable to the extent of 1/10 of the tape width.)
    If the specification is not satisfied, perform the adjustment in accordance with the following procedures.
    1) Loosen the locking screw of the guide roller of the S tension regulator one to two turns using a tape guide adjustment driver.
    2) Put the unit into PLAY mode.
    3) Rotate the upper flange so that the tape runs in the center of the guide roller of the S tension regulator.
    4) Put the unit into REV X1 mode.
    5) Turn the upper flange of the guide roller of the S tension regulator and adjustment nut of the TG-2 tape guide for fine adjustment so that the specification is satisfied.
    6) Put the unit into PLAY mode again. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification, and that the tape running at the TG-2 tape guide and guide roller of the S tension regulator satisfy the specification described on the right column.
       If the specification is not satisfied, readjust repeatedly so that the specification is satisfied in both PLAY and REV modes.
13. Make sure that the head-to-tape contact of the RF envelope waveform in REV X1 mode satisfies the specification.
14. Tighten the locking screws of each tape guide using a tape guide adjustment driver.
15. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification in accordance with Section 6-4.
16. Install the fly wheel to the TG-4 tape guide roller. Make sure that the fly wheel is surely locked, after installation.



$\frac{B}{A} \leq \frac{1}{10}$



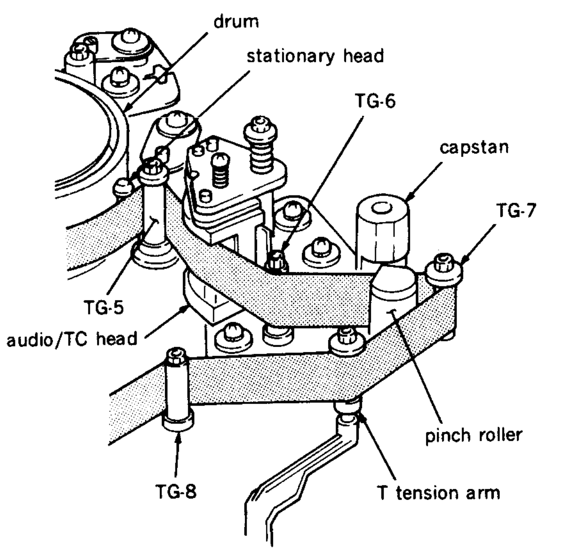
$\frac{F}{E} \geq 0.8$

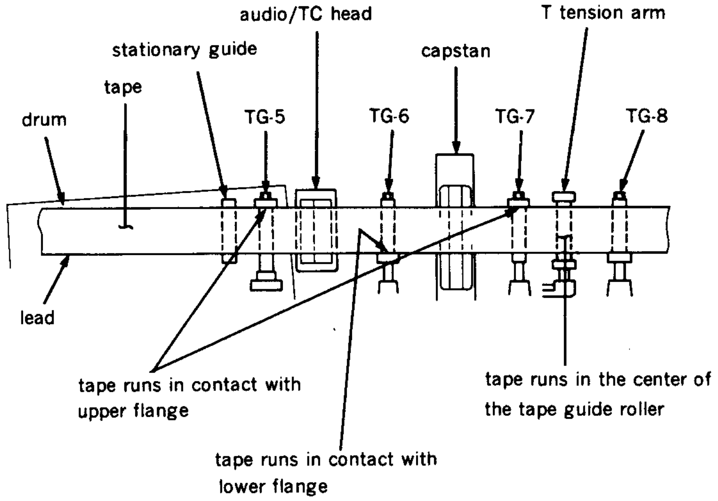
$\frac{G}{E} \geq 0.8$

If the RF envelope waveform on the drum entrance side and tape running do not satisfy the specification even in the above procedure, replace the drum assembly.

Steps (17) and later describe the tracking adjustment on the drum exit side.

17. Set ITEM 913 of SETUP MENU to 1 (ON) using a the search dial according to item 7 in Section 6-1.
18. Loosen the locking screws at the upper part of the TG-5, TG-6, and TG-7 tape guide rollers one to two turns using a tape guide adjustment driver.
19. Insert the alignment tape CR2-1B PS and put the unit into PLAY mode.
20. Turn the search dial so that the RF envelope waveform is 70% to 80% of the maximum output.
21. Turn the adjustment nut of the TG-6 tape guide so that the lower flange of the TG-6 tape guide does not come in contact with the lower edge of the tape.
22. Turn the upper flange of the TG-7 tape guide so that the upper flange of the tape guide does not come in contact with the upper edge of the tape.
23. Turn the upper flange of the TG-5 tape guide so that the RF envelope waveform on the exit side is flat.
    If tape curl can not be removed in the upper flange of the TG-5 tape guide when the RF envelope waveform is flat, make sure that the zenith of an audio/TC head. (Refer to Section 6-2.)
24. Turn the adjustment nut of the TG-6 tape guide so that the lower flange of the TG-6 tape guide comes in contact with the lower edge of the tape.
25. Press REW button, then the unit put into REW mode.
    At that time, make sure that the clearance between the lower flange of the TG-6 tape guide and tape satisfies the specification.
    Specification :
    The clearance between the lower flange and lower edge of the tape should be more than 0.2 mm.
26. Put the unit into PLAY mode, turn the upper flange of the TG-7 tape guide so that the upper flange of the TG-7 tape guide slightly comes in contact with the upper edge of the tape.



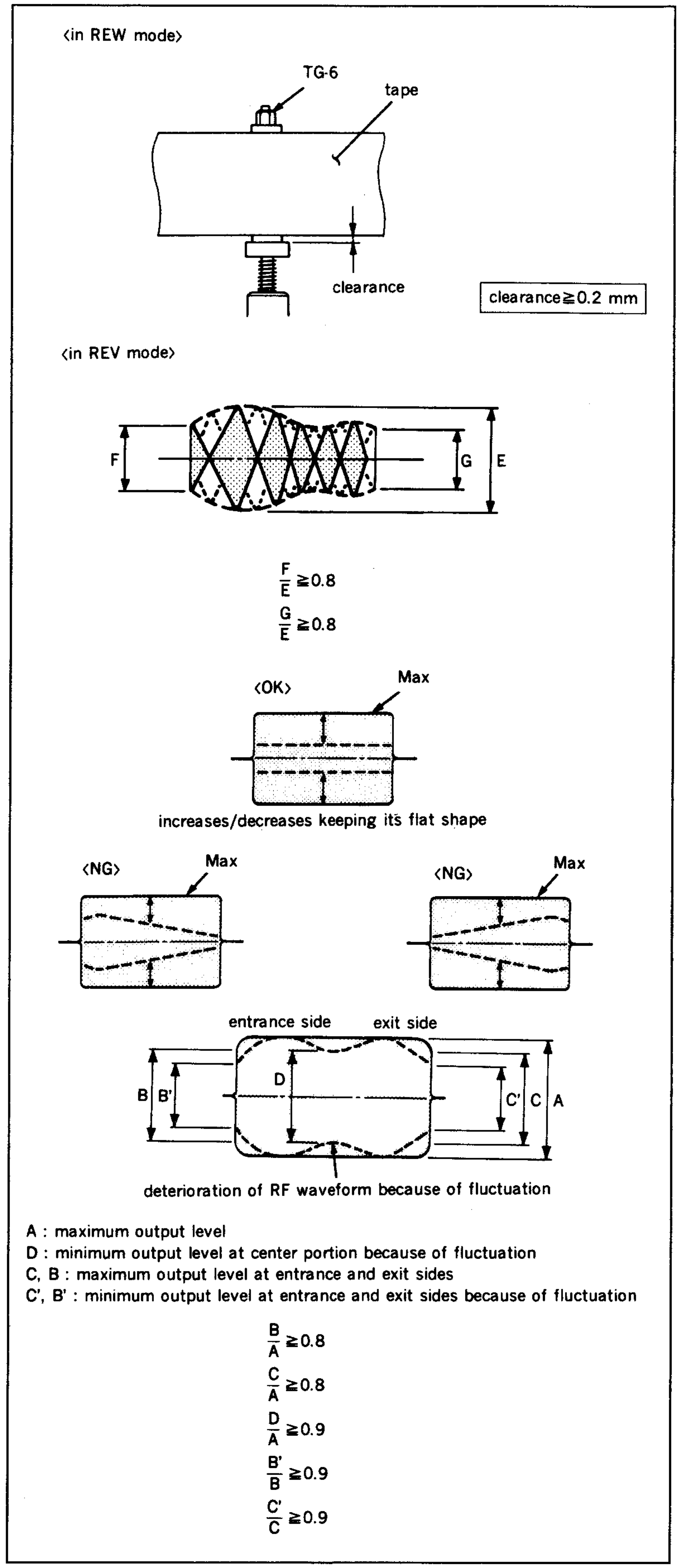

audio/TC head
T tension arm
stationary guide
capstan
tape
drum
TG-5
TG-6
TG-7
TG-8
lead
tape runs in contact with upper flange
tape runs in the center of the tape guide roller
tape runs in contact with lower flange

- The upper edge of the tape runs in contact with the upper flange of the TG-5 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The lower edge of the tape runs in contact with the lower flange of the TG-6 tape guide.
  However, in PLAY, F.FWD, and REW modes, the lower flange of the tape guide must not rotate.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The upper edge of the tape runs in contact with the upper flange of the TG-7 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The tape runs in the center of the guide roller of the T tension arm.
  (In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)

27. Turn the search dial so that the RF envelope waveform is the maximum output.
    Make sure that the head-to-tape contact of the RF envelope waveform on the drum exit side and the fluctuation satisfy the specification.
    Make sure that no tape curl to occur at the tape guide flanges of the TG-5, TG-6 and TG-7 using the adjustment mirror.
    (If tape curl can not be removed, it is acceptable as far as the maximum limit shown in the figure.)
28. Reset ITEM 913 of SETUP MENU to 0 (OFF). (Refer to item 7 in Section 6-1.)
29. Put the unit into REV×1 mode, make sure that the head-to-tape contact of the RF envelope waveform in REV X1 mode satisfies the specification.
30. Tighten the locking screws of each tape guide using a tape guide adjustment driver.
31. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification in accordance with Section 6-4.

If the RF envelope waveform on the drum exit side and the tape running do not satisfy the specification even in the above procedure, replace the drum assembly.

32. Make sure that the tape running at each tape guide satisfy the specification.
    (Refer to steps (1) through (13) in Section 6-3.)
33. Perform CTL head height adjustment.
    (Refer to Section 6-5.)
34. Perform audio head height adjustment.
    (Refer to Section 6-7.)
35. Perform audio head phase adjustment.
    (Refer to Section 6-8.)
36. Perform CTL head position adjustment.
    (Refer to Section 6-6.)
37. Perform TC head position adjustment.
    (Refer to Section 6-10.)
38. Put Bit 3 of S2 (B-1) on DT-30 board in OPEN (OFF) state.
39. Perform reconfirmation of audio head height.
    (Refer to steps (1) through (3) in Section 6-7.)
40. Perform confirmation of audio level (in REV mode). (Refer to Section 6-11.)
41. Install the AU head cover.
    (Refer to step (23) in Section 5-3.)
42. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)



$\frac{F}{E} \geqq 0.8$

$\frac{G}{E} \geqq 0.8$

A : maximum output level
D : minimum output level at center portion because of fluctuation
C, B : maximum output level at entrance and exit sides
C', B' : minimum output level at entrance and exit sides because of fluctuation

$\frac{B}{A} \geqq 0.8$

$\frac{C}{A} \geqq 0.8$

$\frac{D}{A} \geqq 0.9$

$\frac{B'}{B} \geqq 0.9$

$\frac{C'}{C} \geqq 0.9$

43. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
44. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
45. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)

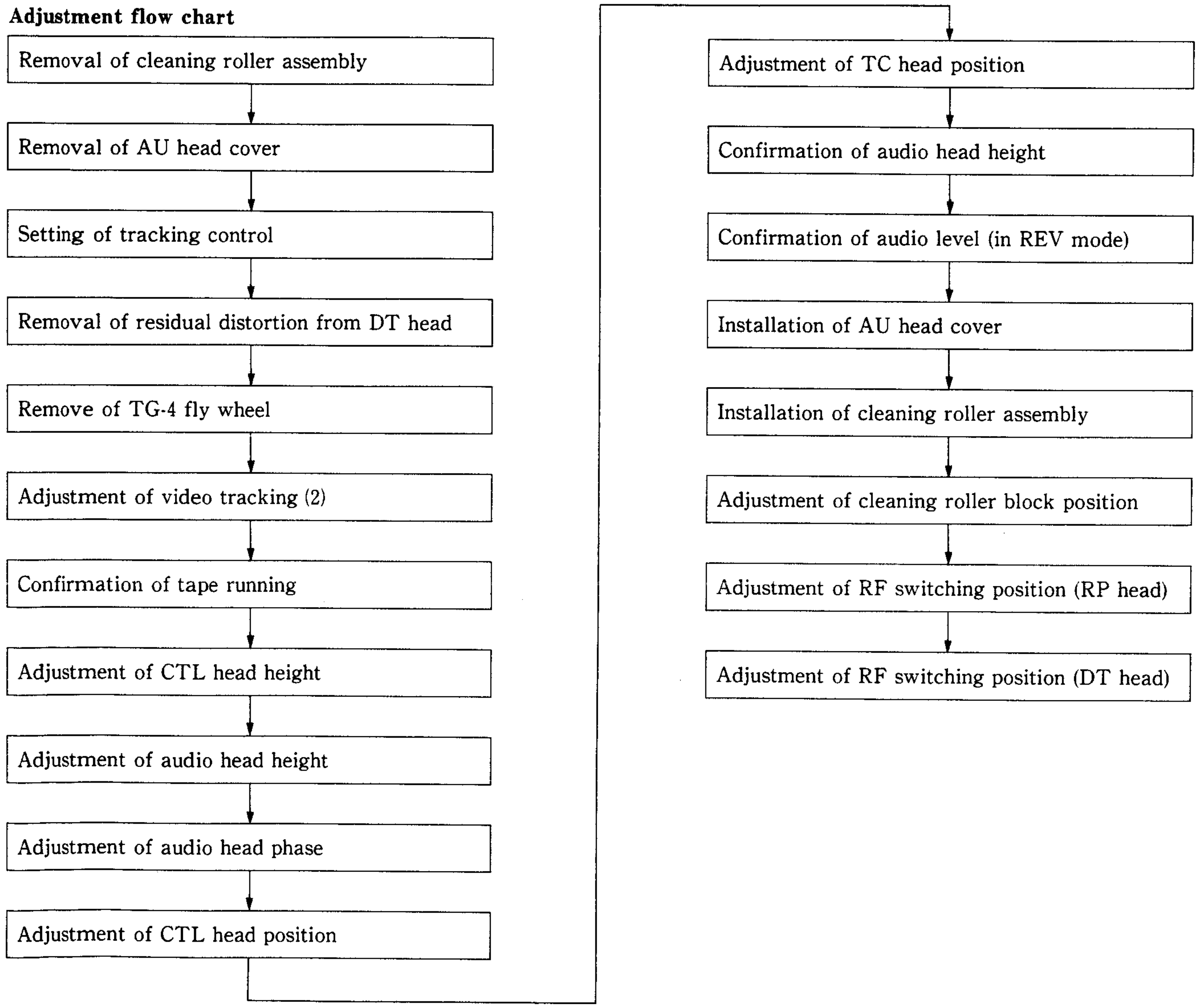
6-4-2. Video Tracking Adjustment (2)

- This section describes how to adjust the video tracking when an S slider assembly is replaced.
- Adjustment of video tracking is extremely important. If this adjustment is not adequate, the tape interchangeability is influenced significantly.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit. By this way, accurate adjustment will be possible without difficulty as a service operation.

Tools

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Alignment tape without lid (CR2-1B PS)	: 8-960-096-51
Tape guide adjustment driver	: J-6321-500-A
Adjustment mirror	: J-6080-029-A
Dualtrace oscilloscope	

Adjustment flow chart


Removal of cleaning roller assembly
Removal of AU head cover
Setting of tracking control
Removal of residual distortion from DT head
Remove of TG-4 fly wheel
Adjustment of video tracking (2)
Confirmation of tape running
Adjustment of CTL head height
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)

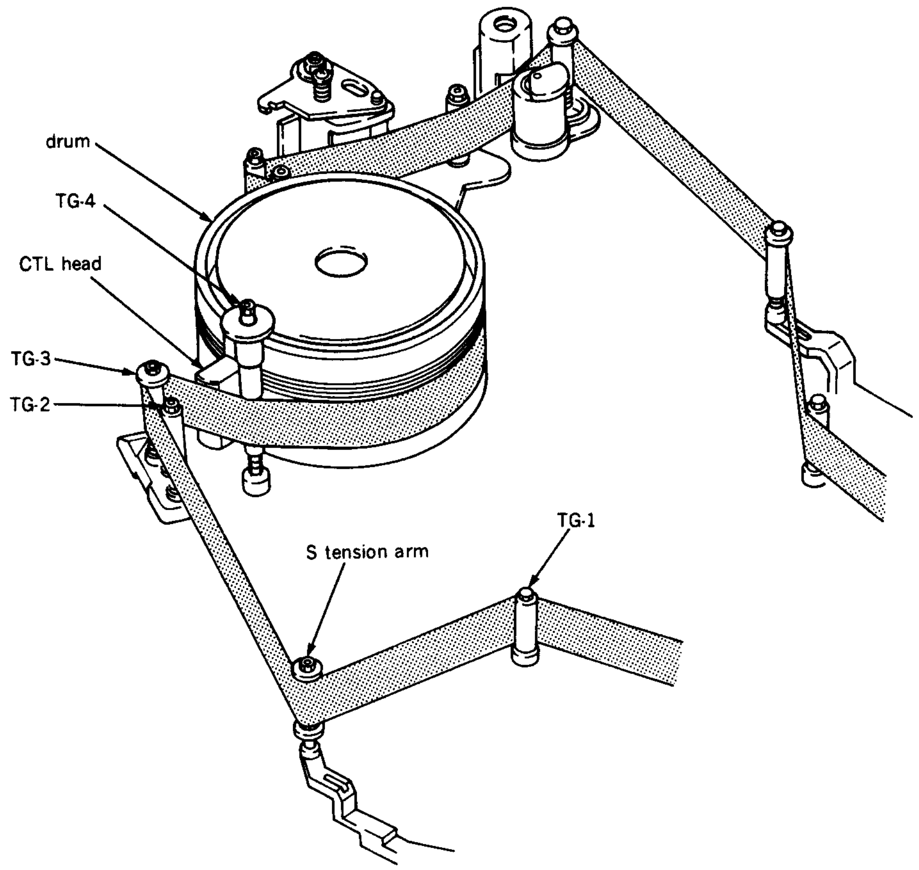
Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)
3. Set ITEM 913 of SETUP MENU to 1 (ON) using a search dial that can operation as a tracking control according to item 7 in Section 6-1.
4. Remove residual distortion from DT head.
   (Refer to item 5 in Section 6-1.)
5. Put Bit 3 of S2 (B-1) on DT-30 board in CLOSE (ON) state.

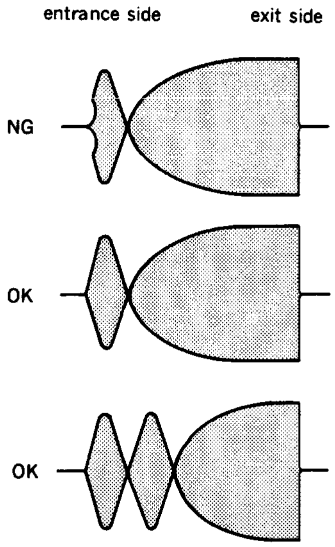
Adjustment

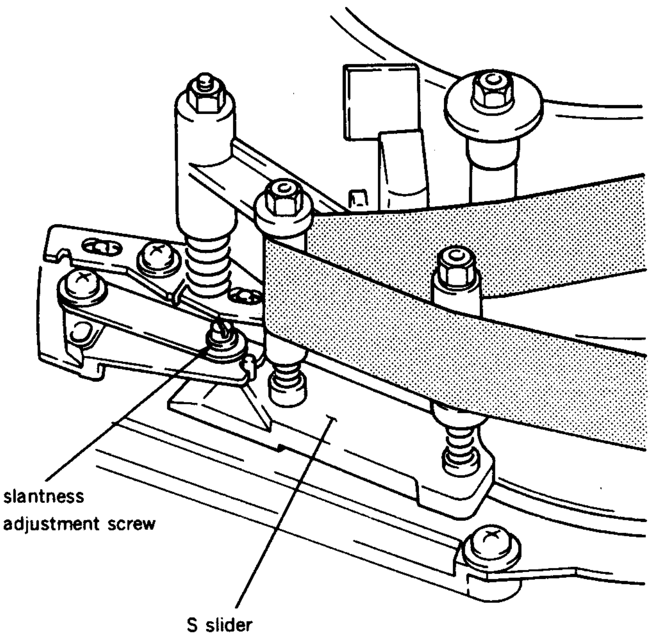
1. Hold claws of the upper part of a TG-4 tape guide roller using tweezers, and remove a fly wheel. (Refer to Section 5-2.)
2. Clean the tape running surface of the tape guides, drum, and video heads with a cleaning piece moistened with cleaning fluid.
3. Connect the oscilloscope as follows.

CH-1 : TP101/VP-33BP board
(Address : Side A, D-1) (Y-RF signal)
CH-2 : TP1/VP-33BP board
(Address : Side A, D-1) (Switching pulse)
TRIG : CH-2



4. Loosen the locking screws at the upper part of a TG-3 tape guide roller, TG-2 tape guide roller and S tension arm one to two turns using a tape guide adjustment driver.
5. Insert an alignment tape CR2-1B and put the unit into PLAY mode.
6. Turn the adjustment nut of the TG-2 tape guide so that a clearance occurs between the lower flange of the TG-2 tape guide and the lower edge of the tape.
7. Turn the upper flange of the TG-3 tape guide so that a clearance occurs between the upper flange of the TG-3 tape guide and the upper edge of the tape.
8. Fine adjust the height of the tape guide of the S tension arm so that the tape runs in the center of the tape guide of the S tension arm.
9. Make sure that the tape does not run in contact with the tape guide flanges of the TG-2, TG-3, TG-4, and S tension arm.
10. Turn the search dial so that the RF envelope waveform on the drum exit side is maximum.
11. Make sure that the RF waveform satisfies the specification as shown in the figure.
    If the specification is not satisfied, perform the adjustment as follows :
    1) Turn the slantness adjustment screw for an S slider assembly in counterclockwise in the range not exceeding 90 degrees to satisfy the specification.
12. Turn the upper flange of the TG-3 tape guide so that it comes in contact with the upper edge of the tape and so that the RF envelope waveform is flat.
13. Turn the search dial so that the RF envelope waveform is 70% to 80% of the maximum output.
14. Turn the adjustment nut of the TG-2 tape guide so that the lower flange of the TG-2 tape guide comes in contact with the lower edge of the tape.





15. Fine adjust the height of the tape guide of the S tension arm so that the tape runs in the center of the tape guide of the S tension arm.
16. Turn the search dial so that the RF envelope waveform is the maximum output.
Make sure that the head-to-tape contact of the RF envelope waveform on the drum entrance side and fluctuation satisfy the specification.
Make sure that no tape curl to occur at the tape guide flanges of the TG-2 and TG-3 using an adjustment mirror.
(If tape curl can not be removed, it is acceptable as far as the maximum limit shown in the figure.)
17. Reset ITEM 913 of SETUP MENU to 1 (OFF). (Refer to item 7 in Section 6-1.)
18. Put the unit into REV X1 mode.
At that time, make sure that the tape curl at the lower flange of the TG-2 tape guide satisfies the specification below.

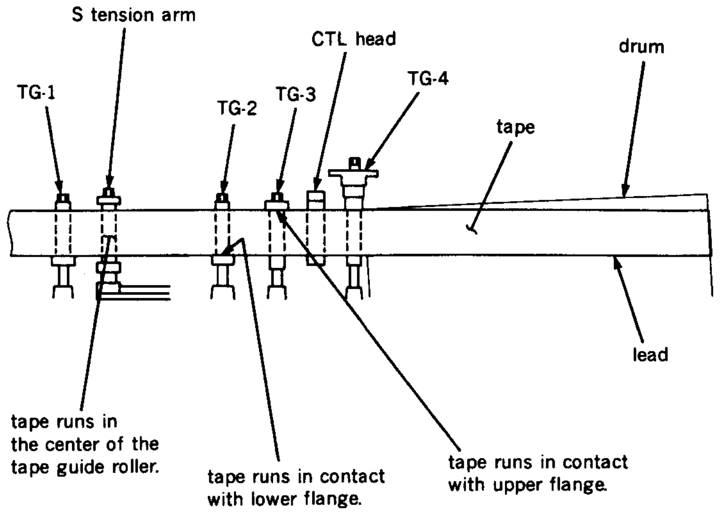
Specification : No tape curl to occur at the lower flange.
(If tape curl can not be removed, it is acceptable to the extent of 1/10 of the tape width.)

If the specification is not satisfied, perform the adjustment in accordance with the following procedure.
1) Put the unit into REV X1 mode.
2) Turn the upper flange of the guide roller of the S tension arm and adjustment nut of the TG-2 tape guide for fine adjustment so that the specification is satisfied.
3) Put the unit into PLAY mode again. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification, and that the tape running at the TG-2 tape guide and guide roller of the S tension arm satisfy the specification described on the right column.

If the specification is not satisfied, readjust repeatedly so that the specification is satisfied in both PLAY and REV modes.

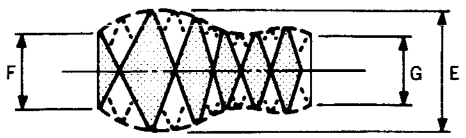
19. Put the unit into REV X1 mode and make sure that the head-to-tape contact of the RF envelope waveform in REV X1 mode satisfies the specification.

- The upper edge of the tape runs in contact with the upper flange of the TG-3 tape guide.
(If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The lower edge of the tape runs in contact with the lower flange of the TG-2 tape guide.
(If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The tape runs in the center of the guide roller of the S tension arm.
(In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)


S tension arm
CTL head
drum
TG-4
TG-1
TG-2
TG-3
tape
lead
tape runs in the center of the tape guide roller.
tape runs in contact with lower flange.
tape runs in contact with upper flange.

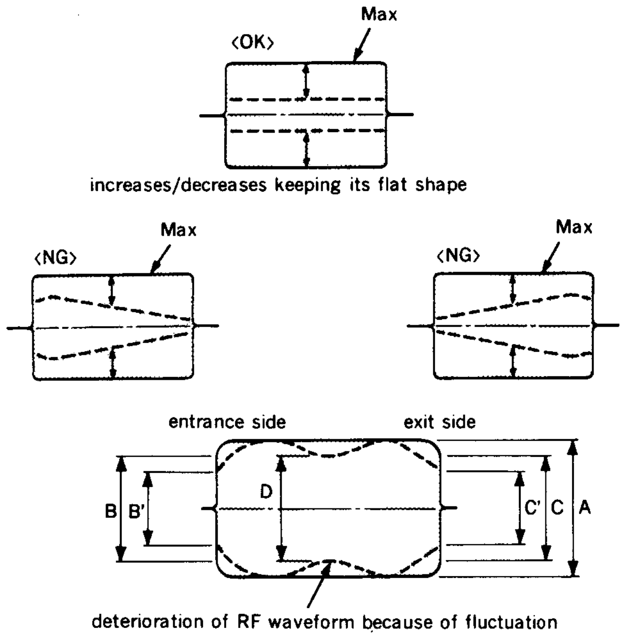
20. Tighten the locking screws of each tape guide using a tape guide adjustment driver.
21. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification in accordance with Section 6-4.
22. Install the fly wheel to the TG-4 tape guide roller. Make sure that the fly wheel is surely locked, after installation.
23. Make sure that the tape running at each tape guide satisfy the specification.
(Refer to steps (1) through (13) in Section 6-3.)
24. Perform CTL head height adjustment.
(Refer to Section 6-5.)
25. Perform audio head height adjustment.
(Refer to Section 6-7.)
26. Perform audio head phase adjustment.
(Refer to Section 6-8.)
27. Perform CTL head position adjustment.
(Refer to Section 6-6.)
28. Perform TC head position adjustment.
(Refer to Section 6-10.)
29. Put Bit 3 of S2 (B-1) on DT-30 board in OPEN (OFF) state.
30. Perform reconfirmation of audio head height.
(Refer to steps (1) through (3) in Section 6-7.)
31. Perform confirmation of audio level (in REV mode). (Refer to Section 6-11.)
32. Install the AU head cover. (Refer to step (23) in Section 5-3.)
33. Install the cleaning roller assembly.
(Refer to steps (7) and (8) in Section 5-6.)
34. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
35. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
36. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)

‹in REV mode›



$$\frac{F}{E} \geqq 0.8$$

$$\frac{G}{E} \geqq 0.8$$


‹OK›
Max
increases/decreases keeping its flat shape
‹NG›
Max
‹NG›
Max
entrance side
exit side
B
B'
D
C'
C
A
deterioration of RF waveform because of fluctuation

A : maximum output level
D : minimum output level at center portion because of fluctuation
C, B : maximum output level at entrance and exit sides
C', B' : minimum output level at entrance and exit sides because of fluctuation

$$\frac{B}{A} \geqq 0.8$$

$$\frac{C}{A} \geqq 0.8$$

$$\frac{D}{A} \geqq 0.9$$

$$\frac{B'}{B} \geqq 0.9$$

$$\frac{C'}{C} \geqq 0.9$$

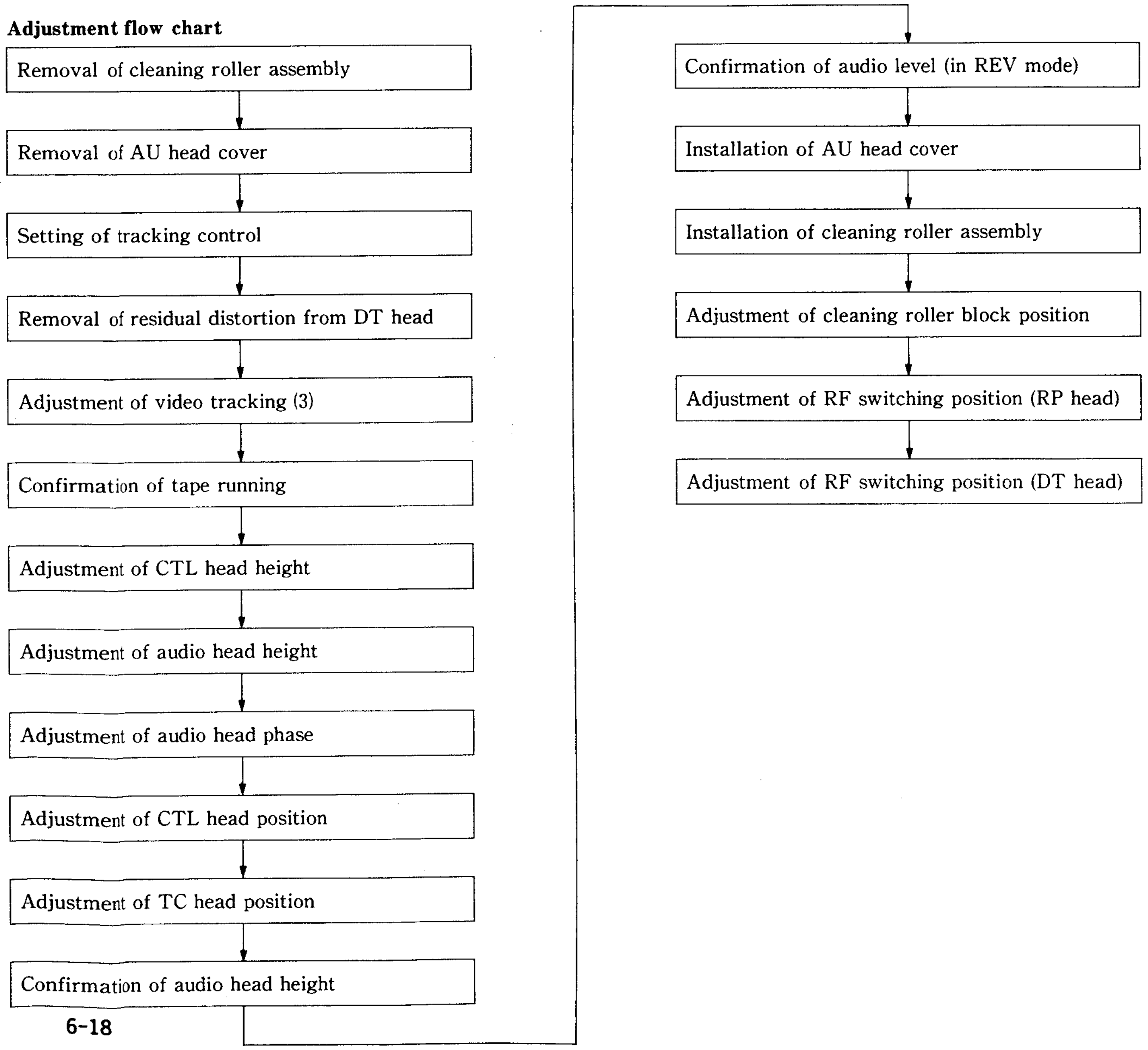
6-4-3. Video Tracking Adjustment (3)

- This section describes how to adjust the video tracking when an T slider assembly is replaced.
- Adjustment of video tracking is extremely important. If this adjustment is not adequate, the tape interchangeability is influenced significantly.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit. By this way, accurate adjustment will be possible without difficulty as a service operation.

Tools

Cleaning piece : 2-034-697-00
Cleaning fluid : 9-919-573-01
Alignment tape without lid (CR2-1B PS) : 8-960-096-51
Tape guide adjustment driver : J-6321-500-A
Adjustment mirror : J-6080-029-A
Dualtrace oscilloscope

Adjustment flow chart

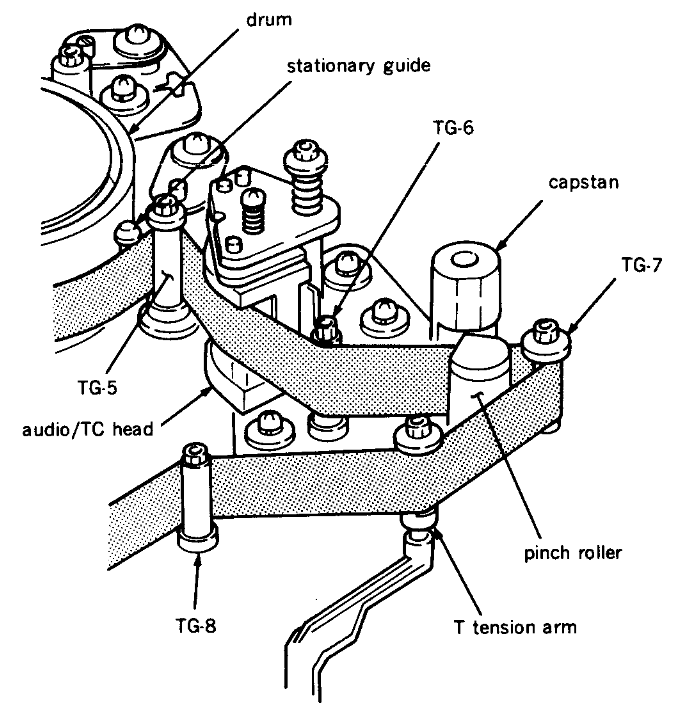

Removal of cleaning roller assembly
Removal of AU head cover
Setting of tracking control
Removal of residual distortion from DT head
Adjustment of video tracking (3)
Confirmation of tape running
Adjustment of CTL head height
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position
Adjustment of RF switching position (RP head)
Adjustment of RF switching position (DT head)

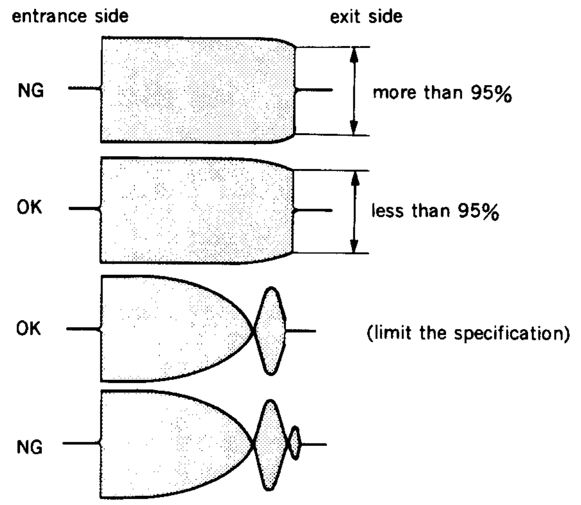
Preparation

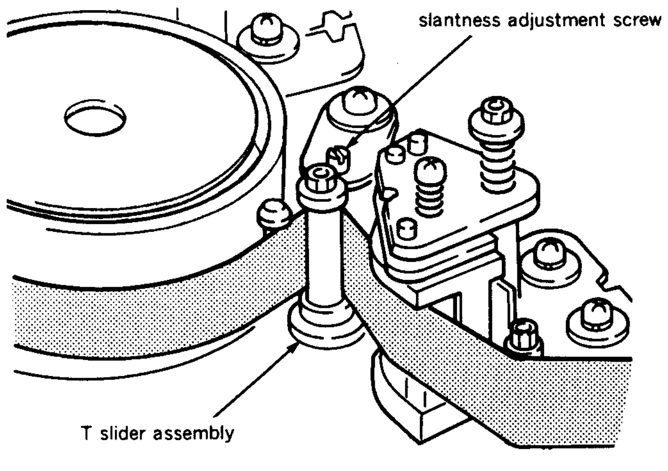
1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)
3. Set ITEM 913 of SETUP MENU to 1 (ON) using a search dial that can operate as a tracking control according to item 7 in Section 6-1.
4. Remove residual distortion from DT head.
   (Refer to item 5 in Section 6-1.)
5. Put Bit 3 of S2 (B-1) on DT-30 board in CLOSE (ON) state.

Adjustment

1. Clean the tape running surface of the tape guides, drum, and video heads with a cleaning piece moistened with cleaning fluid.
2. Connect the oscilloscope as follows.
   CH-1 : TP101/VP-33BP board
   (Address : Side A, D-1) (Y-RF signal)
   CH-2 : TP1/VP-33BP board
   (Address : Side A, D-1) (Switching pulse)
   TRIG : CH-2
3. Loosen the locking screws at the upper part of a TG-5 tape guide roller, TG-6 tape guide roller, TG-7 tape guide roller and T tension arm one to two turns using a tape guide adjustment driver.
4. Insert an alignment tape CR2-1B PS and put the unit into PLAY mode.
5. Turn the upper flange of the TG-5 tape guide so that a clearance occurs between the upper flange of the TG-5 tape guide and the upper edge of the tape.
6. Turn the adjustment nut of the TG-6 tape guide so that a clearance occurs between the lower flange of the TG-6 tape guide and the lower edge of the tape.
7. Turn the upper flange of the TG-7 tape guide so that a clearance occurs between the upper flange of the TG-7 tape guide and the upper edge of the tape.
8. Fine adjust the height of the tape guide of the T tension arm so that the tape runs in the center of the tape guide of the T tension arm.
9. Make sure that the tape does not run in contact with the tape guide flanges of the TG-5, TG-6, TG-7, and T tension arm.
10. Turn the search dial so that the RF envelope waveform on the drum entrance side is maximum.


drum
stationary guide
TG-6
capstan
TG-7
TG-5
audio/TC head
pinch roller
TG-8
T tension arm


entrance side
exit side
NG
more than 95%
OK
less than 95%
OK
(limit the specification)
NG

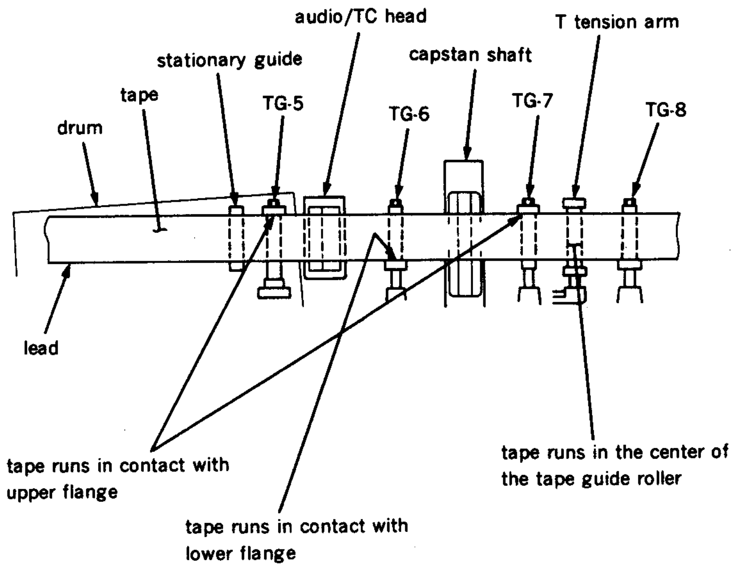

slantness adjustment screw
T slider assembly

11. Make sure that the RF envelope waveform satisfies the specification as shown in the figure.
    If the specification is not satisfied, perform the adjustment as follows :
    1) Turn the slantness adjustment screw for a T slider assembly in counterclockwise in the range not exceeding 30 degrees to satisfy the specification.
12. Turn the upper flange of the TG-5 tape guide so that it comes in contact with the upper edge of the tape and so that the RF envelope waveform is flat.
13. Turn the search dial so that the RF envelope waveform is 70% to 80% of the maximum output.
14. Turn the adjustment nut of the TG-6 tape guide so that the lower flange of the TG-6 tape guide comes in contact with the lower edge of the tape.
15. Press REW button, then the unit put into REW mode.
    At that time, make sure that the clearance between the lower flange of the TG-6 tape guide and tape satisfies the specification.

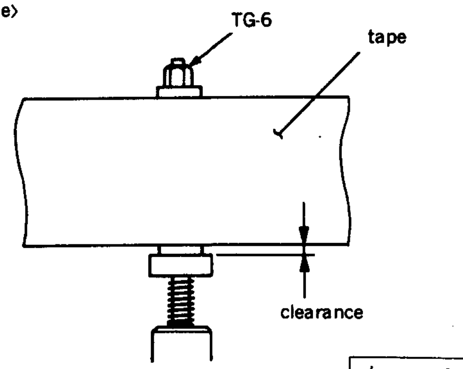
    Specification :
    The clearance between the lower flange and lower edge of the tape should be more than 0.2 mm.

16. Put the unit into PLAY mode, turn the upper flange of the TG-7 tape guide so that the upper flange of the TG-7 tape guide slightly comes in contact with the upper edge of the tape.
17. Fine adjust the height of the tape guide of the T tension arm so that the tape runs in the center of the tape guide of the T tension arm.
18. Turn the search dial so that the RF envelope waveform is the maximum output.
    Make sure that the head-to-tape contact of the RF envelope waveform on the drum exit side and fluctuation satisfy the specification.
    Make sure that no tape curl to occur at the tape guide flanges of the TG-5, TG-6 and TG-7 using an adjustment mirror.
    (If tape curl can not be removed, it is acceptable as far as the maximum limit shown in the figure.)

- The upper edge of the tape runs in contact with the upper flange of the TG-5 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The lower edge of the tape runs in contact with the lower flange of the TG-6 tape guide.
  However, in PLAY, F.FWD, and REW modes, the lower flange of the tape guide must not rotate.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The upper edge of the tape runs in contact with the upper flange of the TG-7 tape guide.
  (If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)
- The tape runs in the center of the guide roller of the T tension arm.
  (In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)


audio/TC head
T tension arm
stationary guide
capstan shaft
tape
TG-5
TG-6
TG-7
TG-8
drum
lead
tape runs in contact with upper flange
tape runs in the center of the tape guide roller
tape runs in contact with lower flange

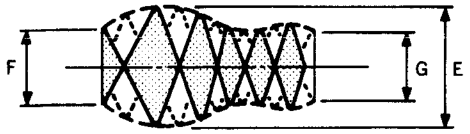
<in REW mode>



clearance≧0.2 mm

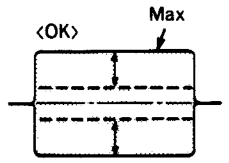
19. Reset ITEM 913 to 1 (OFF).
    (Refer to item 7 in Section 6-1.)
20. Make sure that the head-to-tape contact of the RF envelope waveform in REV X1 mode satisfies the specification.
21. Tighten the locking screws of each tape guide using a tape guide adjustment driver.
22. Make sure that the head-to-tape contact of the RF envelope waveform and fluctuation satisfy the specification in accordance with Section 6-4.
23. Make sure that the tape running at each tape guide satisfy the specification.
    (Refer to steps (1) through ⒀ in Section 6-3.)
24. Perform CTL head height adjustment.
    (Refer to Section 6-5.)
25. Perform audio head height adjustment.
    (Refer to Section 6-7.)
26. Perform audio head phase adjustment.
    (Refer to Section 6-8.)
27. Perform CTL head position adjustment.
    (Refer to Section 6-6.)
28. Perform TC head position adjustment.
    (Refer to Section 6-10.)
29. Put Bit 3 of S2 (B-1) on DT-30 board in OPEN (OFF) state.
30. Perform reconfirmation of audio head height.
    (Refer to steps (1) through (3) in Section 6-7.)
31. Perform confirmation of audio level (in REV mode). (Refer to Section 6-11.)
32. Install the AU head cover. (Refer to step ㉓ in Section 5-3.)
33. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
34. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)
35. Perform RF switching position (RP head) adjustment. (Refer to Section 6-12.)
36. Perform RF switching position (DT head) adjustment. (Refer to Section 6-13.)

<in REW mode>

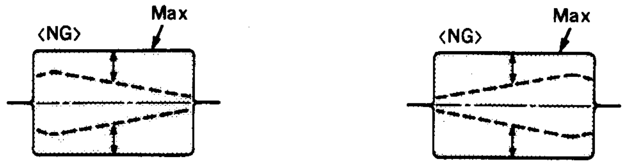


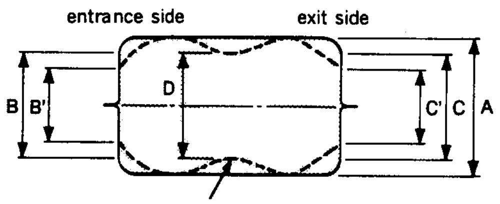
$\frac{F}{E} \geqq 0.8$

$\frac{G}{E} \geqq 0.8$



increases/decreases keeping its flat shape





deterioration of RF waveform because of fluctuation

A : maximum output level
D : minimum output level at center portion because of fluctuation
C, B : maximum output level at entrance and exit sides
C', B' : minimum output level at entrance and exit sides because of fluctuation

$\frac{B}{A} \geqq 0.8$

$\frac{C}{A} \geqq 0.8$

$\frac{D}{A} \geqq 0.9$

$\frac{B'}{B} \geqq 0.9$

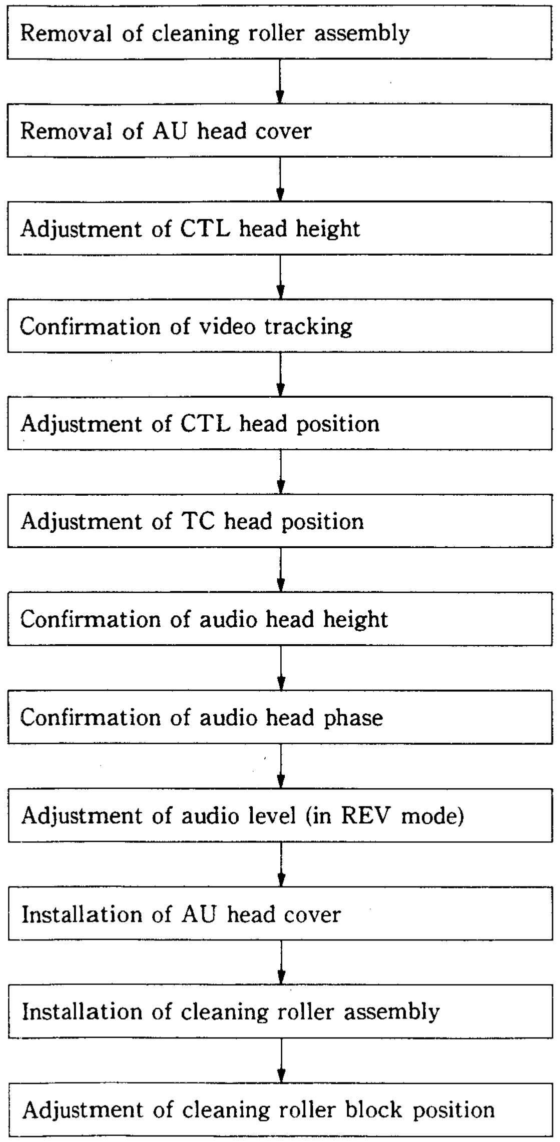
$\frac{C'}{C} \geqq 0.9$

6-5. CTL HEAD HEIGHT ADJUSTMENT

Tools

Alignment tape CR8-1A PS : 8-960-098-45
Dualtrace oscilloscope
Box screwdriver (Across flat has 5.5 mm)

Adjustment flow chart

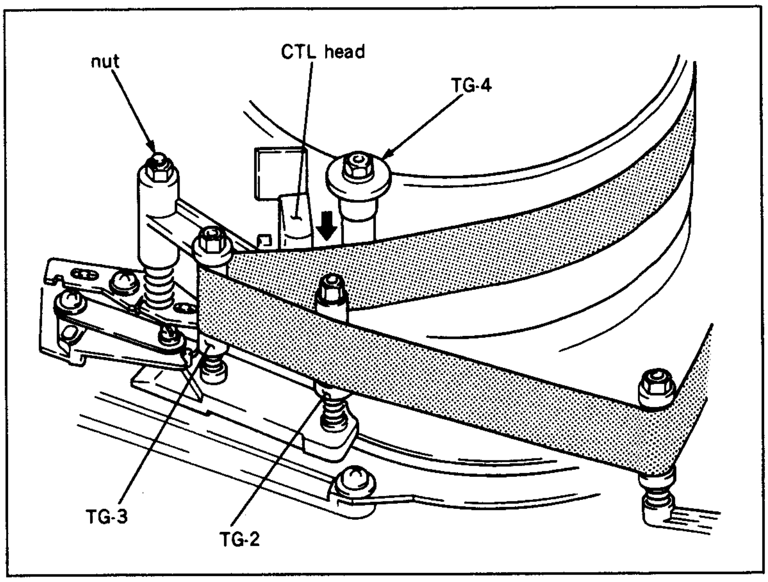

Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of CTL head height
Confirmation of video tracking
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Adjustment of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

1. Connect the oscilloscope as follows.
   CH-1 : TP806/SS-48P board
   (Address : Side A, D-1) (CTL signal)
2. Insert an alignment tape CR8-1A PS into the unit and play back the portion where 1 kHz signal has been recorded on a CTL track.
3. Make sure that the level goes down when the portion (between a CTL head and TG-4 tape guide) of the tape shown in the figure is pressed down or pushed up slightly.
   If the level goes up, perform steps (4) and later.
   If the level goes down, perform steps (5) and later.



Adjustment

4. In case the level goes up when the tape is pressed down :
   (1) Turn the nut shown in the figure in counterclockwise using a box screwdriver so that the output waveform is maximum.

   In case the level goes up when the tape is pushed up :
   (1) Turn the nut shown in the figure in clockwise using a box screwdriver so that the output waveform is maximum.
5. Make sure that the video tracking on the drum entrance side satisfied the specification. (Refer to Section 6-4.)
6. Perform CTL head position adjustment. (Refer to Section 6-6.)
7. Perform TC head position adjustment. (Refer to Section 6-10.)
8. Perform confirmation of audio head height. (Refer to steps (1) through (3) in Section 6-7.)
9. Perform confirmation of audio head phase. (Refer to steps (1) through (4) in Section 6-8.)
10. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
11. Install the AU head cover. (Refer to step (23) in Section 5-3.)
12. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
13. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

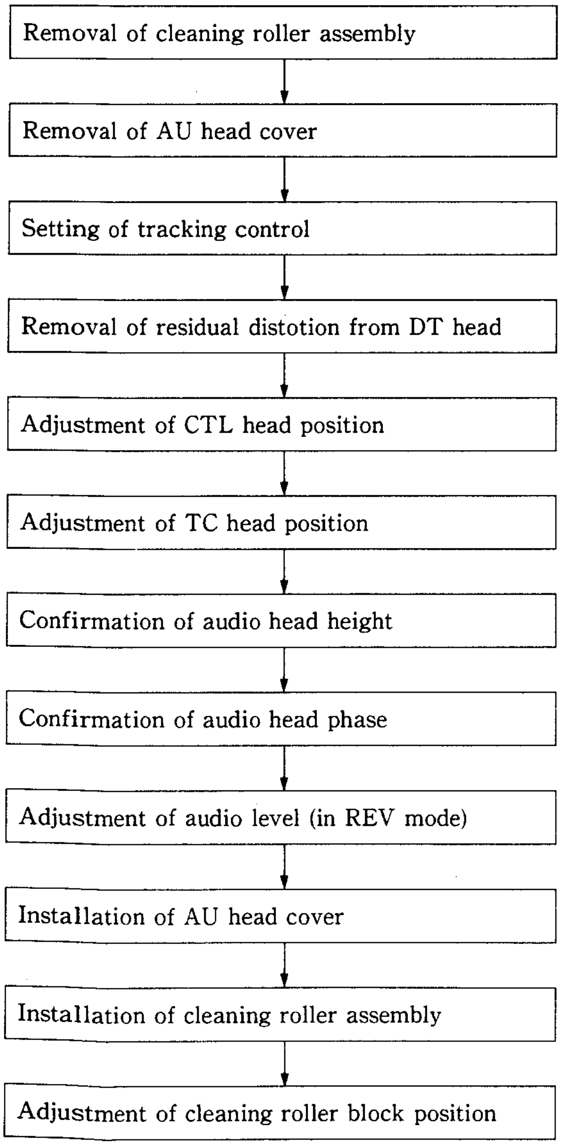
6-6. CTL HEAD POSITION ADJUSTMENT

- Adjustment of CTL head position is extremely important. If this adjustment is not adequate, the tape interchangeability is influenced significantly.
  Take utmost care in performing adjustment.
- Perform this adjustment with the cassette compartment installed in the unit.

Tools

Alignment tape CR2-1B PS : 8-960-096-51
Dualtrace oscilloscope

Adjustment flow chart

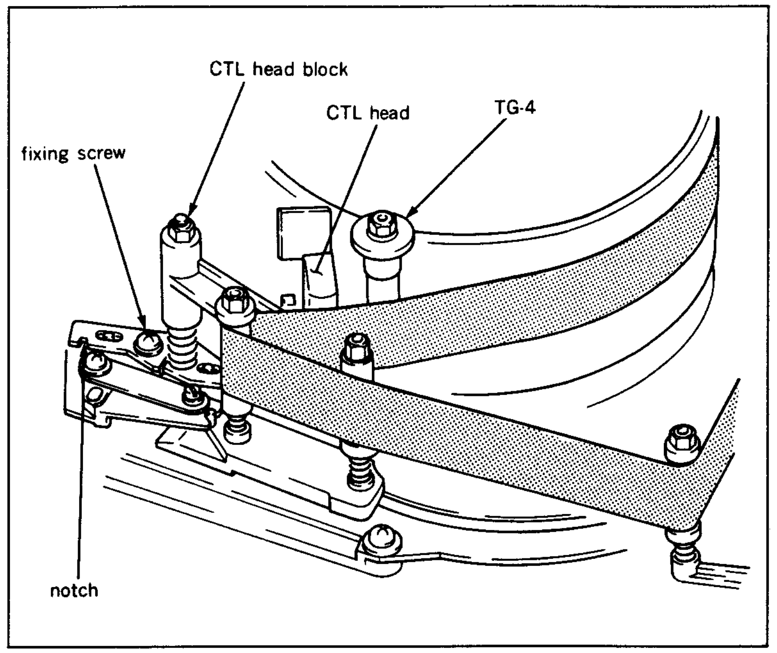

Removal of cleaning roller assembly
Removal of AU head cover
Setting of tracking control
Removal of residual distotion from DT head
Adjustment of CTL head position
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Adjustment of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)
3. Set ITEM 913 of SETUP MENU to 1 (ON) using a search dial that can operate as a tracking control according to item 7 in Section 6-1.
4. Remove resibual distortion from DT head.
   (Refer to item 5 in Section 6-1.)
5. Put Bit 3 of S2 (B-1) on DT-30 board in CLOSE (ON) state.

Check

1. Connect the oscilloscope as follows.
   CH-1 : TP103/VP-33BP board
   (Address : Side A, A-1) (Y-RF signal)
   CH-2 : TP1/VP-33BP board
   (Address : Side A, D-1) (Switching pulse)
   TRIG : CH-2
2. Insert an alignment tape CR2-1B PS into the unit and put the unit into PLAY mode.
3. Turn the search dial and confirm that the output in the center of the RF envelope waveform is maximum when it is set to the STILL position.
   If the specification is satisfied, perform steps (11) and later.
   If the specification is not satisfied, perform steps (4) and later.



Adjustment

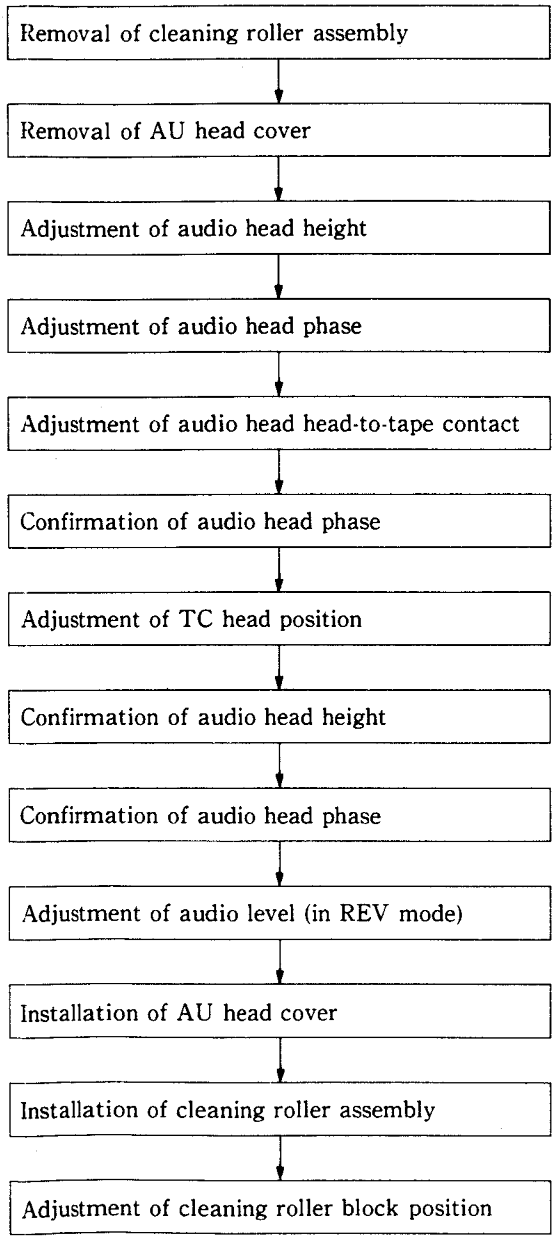
4. Turn the search dial and set it to the STILL position.
5. Loosen a fixing screw of the CTL head block by 1/4 to 1/2 turn.
6. Insert a 3 mm flatbladed screwdriver into the notch of the CTL head block and adjust the CTL head block position so that the center level of the RF envelope waveform is maximized.
7. Tighten a fixing screw of the CTL head block.
8. Make sure that the specification is satisfied in accordance with the check procedures.
9. Reset ITEM 913 to 0 (OFF).
   (Refer to item 7 in Section 6-1.)
10. Put Bit 3 of S2 (B-1) on DT-30 board in OPEN (OFF) state.
11. Perform TC head position adjustment.
    (Refer to Section 6-10.)
12. Perform confirmation of audio head height.
    (Refer steps (1) through (3) in Section 6-7.)
13. Perform confirmation of audio head phase.
    (Refer to steps (1) through (4) in Section 6-8.)
14. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
15. Install the AU head cover. (Refer to step (23) in Section 5-3.)
16. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
17. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

6-7. AUDIO HEAD HEIGHT ADJUSTMENT

Tools

Alignment tape CR8-1A : 8-960-097-45
Dualtrace oscilloscope
Box screwdriver (Across flat has 5.5 mm)

Adjustment flow chart

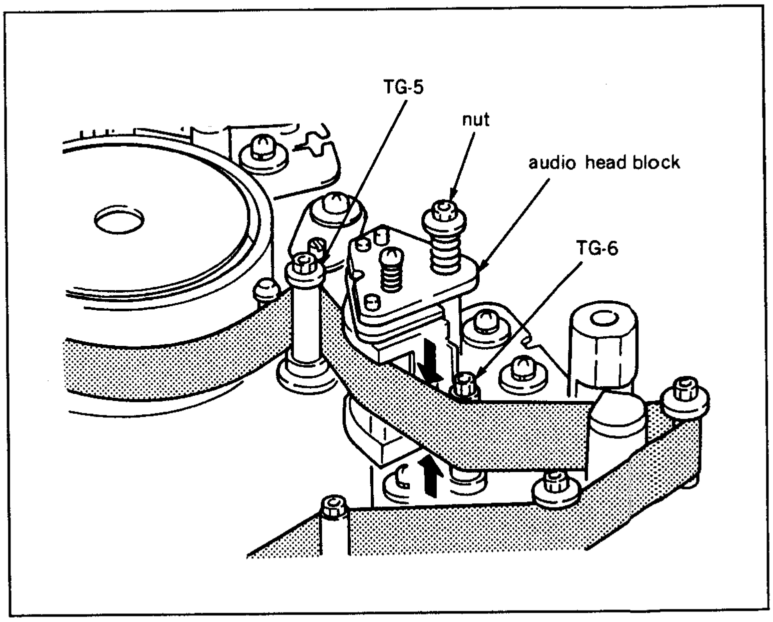

Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of audio head height
Adjustment of audio head phase
Adjustment of audio head head-to-tape contact
Confirmation of audio head phase
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Adjustment of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

1. Connect the oscilloscope as follows.
   CH-1 : TP102/AU-148AP board
   (Address : Side A, A-1) (AUDIO CH-1)
   CH-2 : TP102/AU-149AP board
   (Address : Side A, A-1) (AUDIO CH-2)
2. Insert an alignment tape CR8-1A PS into the unit and play back the 1 kHz 0 VU (8 : 00 to 10 : 00) audio signal portion.
3. Make sure that the level goes down when the portion (between an audio head and TG-6 tape guide) of the tape shown in the figure is pressed down or pushed up.
   If the level goes up, perform steps (4) and later.
   If the level goes down, perform steps (5) and later.



Adjustment

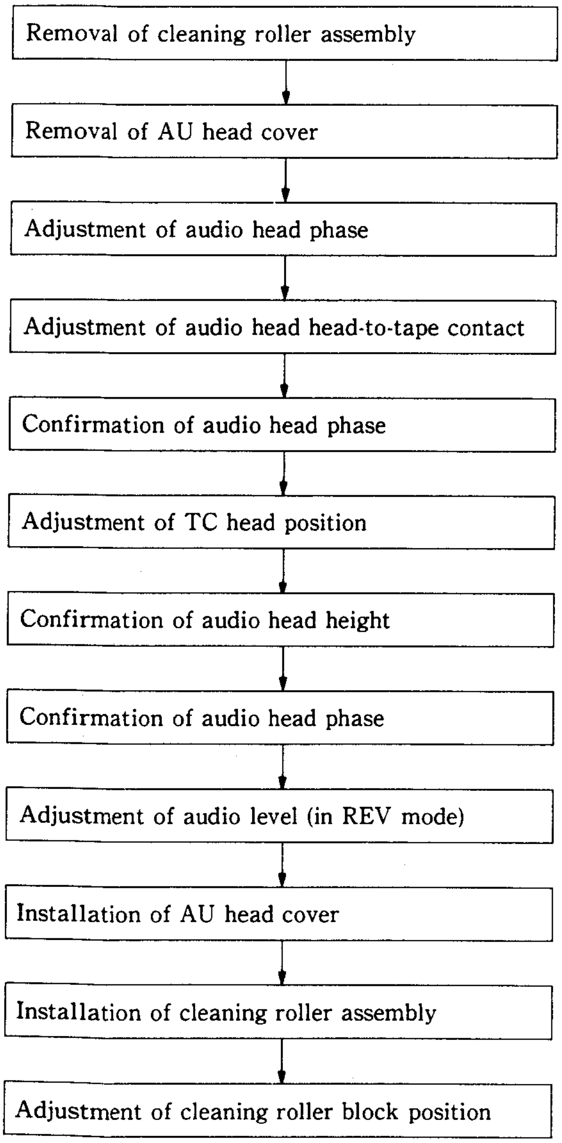
4. In case the level goes up when the tape is pressed down :
   (1) Turn the nut shown in the figure in counterclockwise using a box screwdriver so that the output waveform is maximum.
   In case the level goes up when the tape is pushed up :
   (1) Turn the nut shown in the figure in clockwise using a box screwdriver so that the output waveform is maximum.
5. Perform audio head phase adjustment.
   (Refer to Section 6-8.)
6. Perform audio head head-to-tape contact adjustment. (Refer to Section 6-9.)
7. Perform confirmation of audio head phase.
   (Refer to steps (1) through (4) in Section 6-8.)
8. Perform TC head position adjustment.
   (Refer to Section 6-10.)
9. Perform confirmation of audio head height.
   (Refer to steps (2) and (3) in Section 6-7.)
10. Perform confirmation of audio head phase.
    (Refer to steps (1) through (4) in Section 6-8.)
11. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
12. Install the AU head cover. (Refer to step ㉓ in Section 5-3.)
13. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
14. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

6-8. AUDIO HEAD PHASE ADJUSTMENT

Tools

Alignment tape CR8-1A PS : 8-960-098-45
Dualtrace oscilloscope

Adjustment flow chart

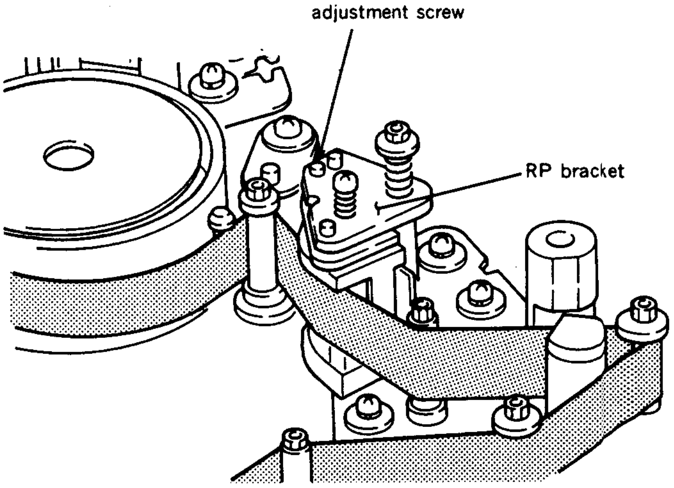

Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of audio head phase
Adjustment of audio head head-to-tape contact
Confirmation of audio head phase
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Adjustment of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

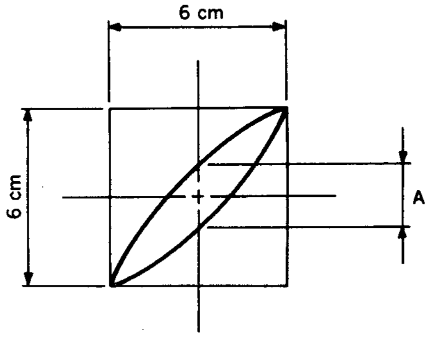
Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

1. Connect the oscilloscope as follows.
   CH-1 : TP102 on AU-148AP board
   (Address : Side A, A-1) (AUDIO CH-1)
   CH-2 : TP102 on AU-149AP board
   (Address : Side A, A-1) (AUDIO CH-2)
2. Insert an alignment tape CR8-1A PS into the unit and play back the 10 kHz, -10 dB (3 : 00 to 4 : 55) audio signal portion.
3. Adjust the scope for horizontal and vertical amplitude to 6 cm of a lissajous waveform.
4. Make sure that the vertical amplitude at the center of the horizontal direction satisfies the specification.
   Then, strike the portion of a RP bracket shown in the figure lightly with the tip of a screwdriver and make sure that the phase in this case satisfies the specification.
   If the specification is satisfied, perform steps (7) and later.
   If the specification is not satisfied, perform steps (5) and later.





Spec. : A≤0.52 cm

Adjustment

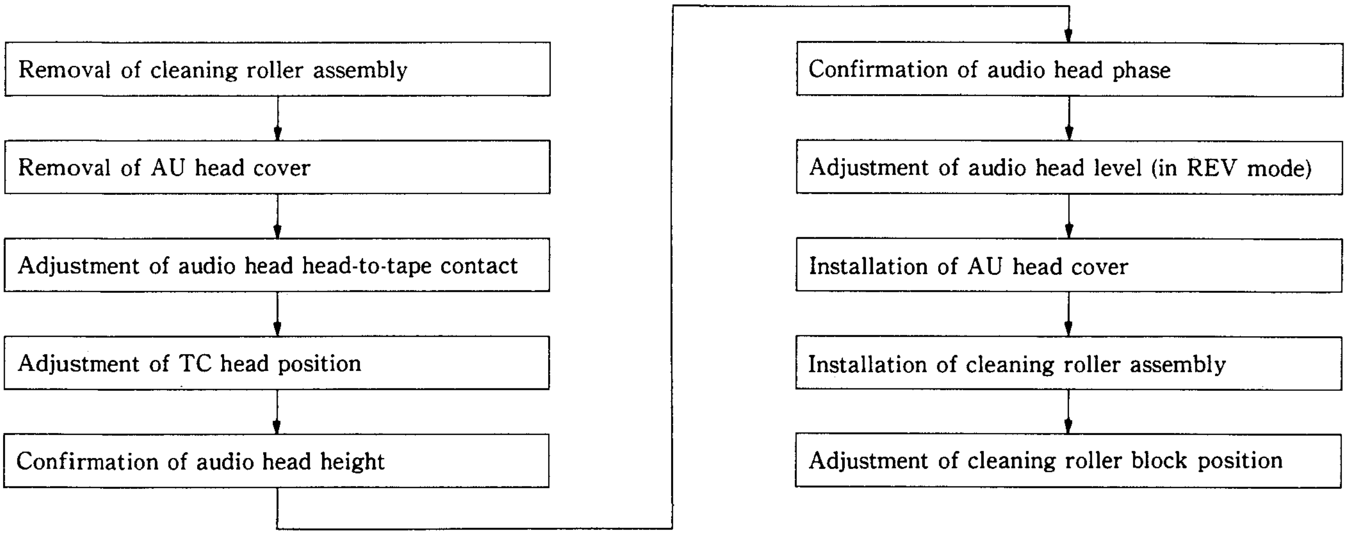
5. Turn the adjustment screw shown in the figure so that the specification is satisfied.
6. Perform step (4) in the check procedure, then perform reconfirmation of audio head phase.
7. Perform audio head head-to-tape contact adjustment. (Refer to Section 6-9.)
8. Perform step (4) in the check procedure, then perform reconfirmation of audio head phase.
9. Perform TC head position adjustment.
   (Refer to Section 6-10.)
10. Perform confirmation of audio head height.
    (Refer to steps (1) through (3) in Section 6-7.)
11. Perform step (4) in the check procedure, then perform reconfirmation of audio head phase.
12. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
13. Install the AU head cover.
    (Refer to step ㉓ in Section 5-3.)
14. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
15. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)

6-9. AUDIO HEAD HEAD-TO-TAPE CONTACT ADJUSTMENT

Tools

Alignment tape CR8-1A PS	: 8-960-098-45
Audio level meter	
Tension scale	: 7-732-050-20

Adjustment flow chart


Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of audio head head-to-tape contact
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Adjustment of audio head level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

1. Connect the oscilloscope as follows.
   CH-1 : AUDIO OUT CH-1 connector on the connector panel
   CH-2 : AUDIO OUT CH-2 connector on the connector panel
2. Insert an alignment tape CR8-1A PS into the unit and play back the 10 kHz, -10 dB (3 : 00 to 4 : 55) audio signal portion.

3. Push the upper part of the tape between an audio head and TG-6 tape guide slightly in the direction shown by the arrow. Push the upper part of the tape between the audio head and TG-5 tape guide slightly in the direction shown by the arrow.
   Make sure that the change in a level satisfies specification 1 in both channels.

   Specification 1 : The change in a level must be less than 0.3 dB.

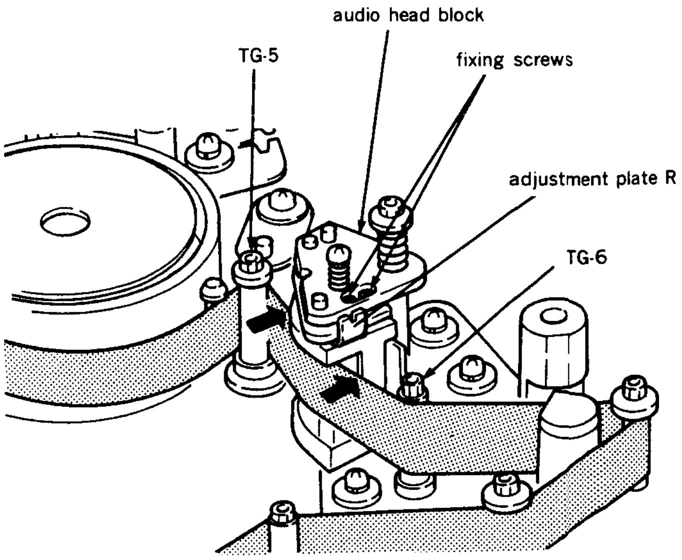
4. Put the tension scale on the portion of a S tension arm shown in the figure, and push it in the direction shown by the arrow until 20 g is indicated.
   Make sure that the change in a level satisfies specification 2 in both channels.

   Specification 2 : The change in a level must be less than 0.3 dB.

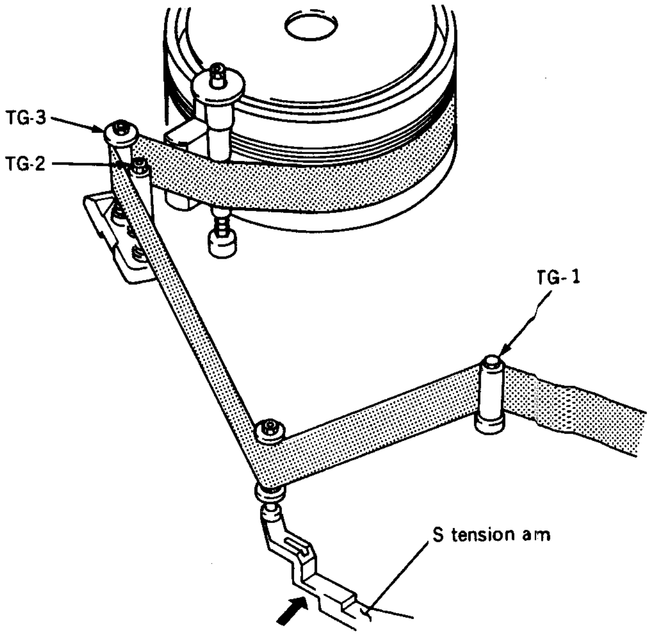
   If specifications 1 and 2 are satisfied, perform step (9).
   If specification 1 or 2 is satisfied, perform steps (5) and later.

Adjustment

5. Loosen two fixing screws of the head shown in the figure by 1/4 to 1/2 turn.
6. Insert a 3 mm flatbladed screwdriver into the notch of an adjustment plate R shown in the figure and adjust the head-to-tape contact so that the level is maximum.
7. Tighten two screws of the head.
8. Make sure that the specification is satisfied in accordance with the check procedure.
9. Perform TC head position adjustment. (Refer to Section 6-10.)
10. Perform confirmation of audio head height. (Refer to steps (1) through (3) in Section 6-7.)
11. Perform confirmation of audio head phase. (Refer to steps (1) through (4) in Section 6-8.)
12. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
13. Install the AU head cover. (Refer to step (23) in Section 5-3.)
14. Install the cleaning roller assembly. (Refer to steps (7) and (8) in Section 5-6.)
15. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)



Spec. 1 : The change in a level must be less than 0.3 dB



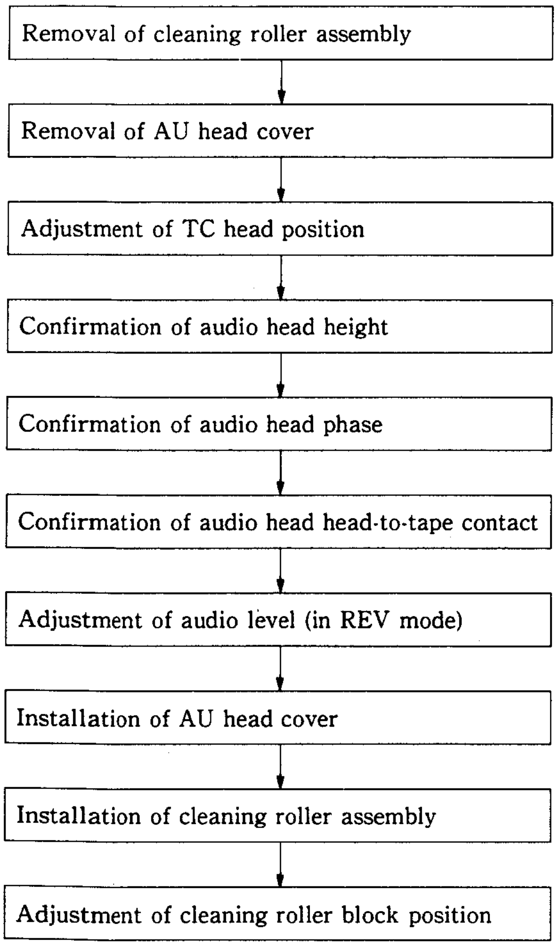
Spec. 2 : The change in a level must be less than 0.3 dB

6-10. TC HEAD POSITION ADJUSTMENT

Tools

Alignment tape CR2-1B PS : 8-960-096-51
Dualtrace oscilloscope

Adjustment flow chart


Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of TC head position
Confirmation of audio head height
Confirmation of audio head phase
Confirmation of audio head head-to-tape contact
Adjustment of audio level (in REV mode)
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

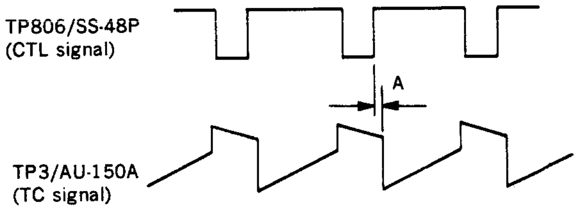
1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

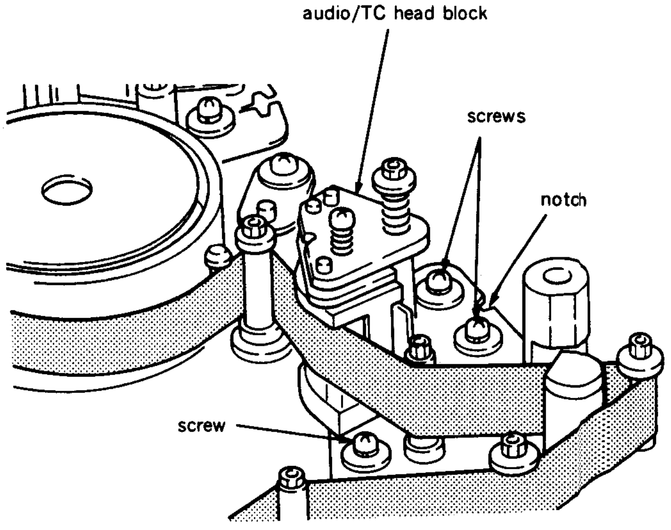
1. Connect the oscilloscope as follows.
   CH-1 : TP806/SS-48P board
   (Address : Side A, D-1) (CTL signal)
   CH-2 : TP3/AU-150A board
   (Address : Side A, B-3) (TC signal)
   TRIG : TP1/VP-33BP board
   (Address : Side A, D-1)
   (Switching pulse)
2. Insert an alignment tape CR2-1B PS into the unit and put the unit into PLAY mode.
3. Make sure that the positional relationship between a CTL signal and TC signal satisfy the specification.
   If the specification is satisfied, perform steps (8) and later.
   If the specification is not satisfied, perform steps (4) and later.

Adjustment

4. Loosen three fixing screws of an audio/TC head block by 1/4 to 1/2 turn.
5. Insert a 3 mm flatbladed screwdriver into the notch of the audio/TC head block shown in the figure and adjust the audio/TC head block position so that the specification is satisfied.
6. Tighten three screws of the audio/TC head block.
7. Make sure that the specification is satisfied in accordance with the check procedure.
8. Perform confirmation of audio head height. (Refer to steps (1) through (3) in Section 6-7.)
9. Perform confirmation of audio head phase. (Refer to steps (1) through (4) in Section 6-8.)
10. Perform confirmation of audio head head-to-tape contact. (Refer to steps (1) through (4) in Section 6-9.)
11. Perform audio level adjustment (in REV mode). (Refer to Section 6-11.)
12. Install the AU head cover. (Refer to step ㉓ in Section 5-3.)
13. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
14. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)



Spec. : A=0 ± 400 μs

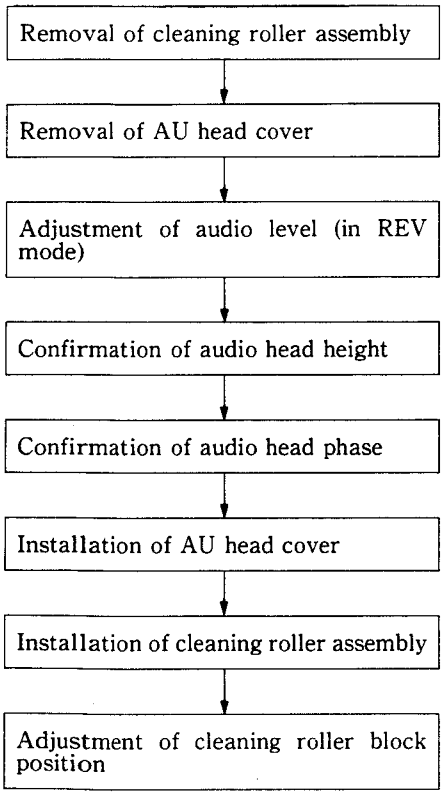


6-11. AUDIO LEVEL ADJUSTMENT (IN REV MODE)

Tools

Alignment tape CR8-1A PS : 8-960-098-45
Tape guide adjustment driver: J-6321-500-A
Adjustment mirror : J-6080-029-A
Dualtrace oscilloscope

Adjustment flow chart



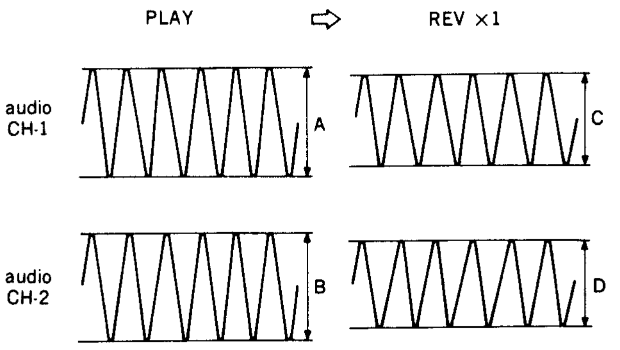
Removal of cleaning roller assembly
Removal of AU head cover
Adjustment of audio level (in REV mode)
Confirmation of audio head height
Confirmation of audio head phase
Installation of AU head cover
Installation of cleaning roller assembly
Adjustment of cleaning roller block position

Preparation

1. Remove a cleaning roller assembly.
   (Refer to steps (1) and (2) in Section 5-6.)
2. Remove an AU head cover.
   (Refer to step (3) in Section 5-3.)

Check

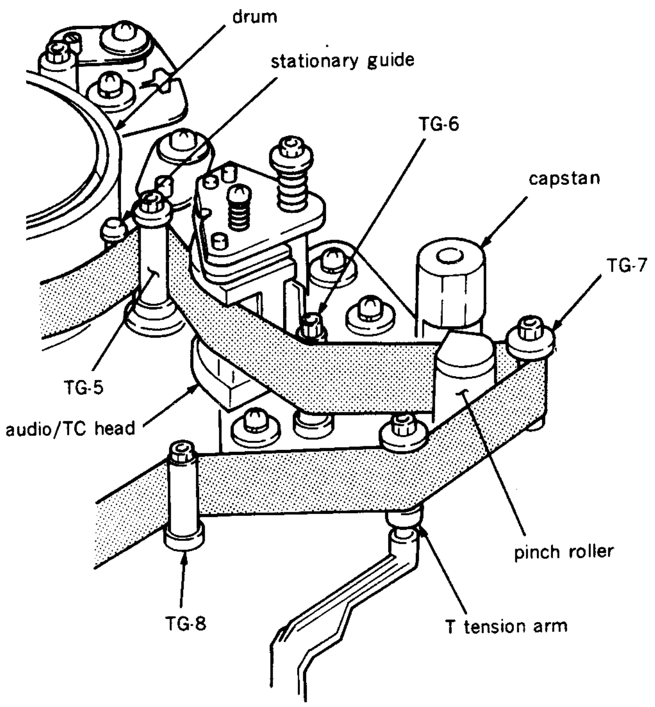
1. Connect the oscilloscope as follows.
   CH-1 : AUDIO OUT CH-1 connector on the connector panel
   CH-2 : AUDIO OUT CH-2 connector on the connector panel


PLAY
REV ×1
audio CH-1
A
C
audio CH-2
B
D

Spec.:

$\frac{C}{A} \geq 0.95$

$\frac{D}{B} \geq 0.95$


drum
stationary guide
TG-6
capstan
TG-7
TG-5
audio/TC head
pinch roller
TG-8
T tension arm

2. Insert an alignment tape CR8-1A PS into the unit, and play back the 10 kHz, −10 dB audio signal portion, and memorize the CH-1 and CH-2 levels. (The CH-1 level is defined as A, and the CH-2 level as B.)
3. Put the unit into REV X1 mode.
4. Make sure that the CH-1 and CH-2 levels satisfy the specification below. (The CH-1 level is defined as C, and the CH-2 level as D.)

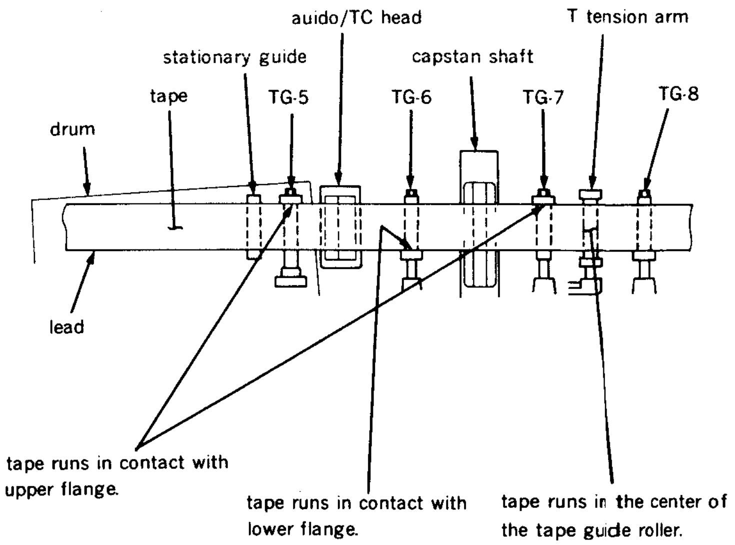
   Specification :

   CH-1 : C/A level must be more than 0.95.
   CH-2 : D/B level must be more than 0.95.

   If the specification is not satisfied, perform steps (5) and later.

Adjustment

5. Loosen the locking screw at the upper part of a TG-7 tape guide two to three turns using a tape guide adjustment driver.
6. Fine adjust the height of the TG-7 tape guide so that the specification is satisfied in REV X1 mode.
7. Put the unit into PLAY, REV X1, F.FWD and REW modes, and change the mode from STOP to F.FWD modes, and from STOP to REW modes.
   Using an adjustment mirror, make sure that the tape running at the flanges of the TG-6, TG-7, and T tension arm satisfy the specification in every mode.
8. Perform confirmation of audio head height. (Refer to steps (1) through (3) in Section 6-7.)
9. Perform confirmation of audio head phase. (Refer to steps (1) through (4) in Section 6-8.)
10. Install the AU head cover. (Refer to step ㉓ in Section 5-3.)
11. Install the cleaning roller assembly.
    (Refer to steps (7) and (8) in Section 5-6.)
12. Perform cleaning roller block position adjustment. (Refer to Section 5-6-1.)


auido/TC head
T tension arm
stationary guide
capstan shaft
tape
TG-5
TG-6
TG-7
TG-8
drum
lead
tape runs in contact with upper flange.
tape runs in contact with lower flange.
tape runs in the center of the tape guide roller.

TG-6 : The lower edge of the tape runs in contact with the lower flange of the TG-6 tape guide.
However, in PLAY, F.FWD, and REW modes, the lower flange of the tape guide must not rotate.
(If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)

TG-7 : The upper edge of the tape runs in contact with the upper flange of the TG-7 tape guide.
(If a tape curl exists, it is acceptable to the extent of 1/10 of the tape width.)

T tension arm : The tape runs in the center of the guide roller of the T tension arm.
(In modes other than PLAY, if a tape curl exists at the upper or lower flange, it is acceptable to the extent of 1/10 of the tape width.)

6-12. RF SWITCHING POSITION ADJUSTMENT (RP HEAD)

Perform this RF switching position (RP head) and (DT head) adjustments when a video tracking adjustment is performed.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Tool

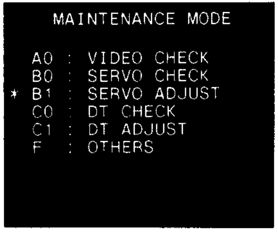
Alignment tape CR2-1B PS : 8-960-096-51

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment does not accept the mode other than EJECT.)
2. Put Bit1 and Bit4 of S601 on SS-48P board in CLOSE state. Press S302 and put the unit into maintenance mode.
3. Press the search dial to enter the jog mode, and move ∗ mark to "B1 : SERVO ADJUST" which is displaying on the monitor screen with the search dial.
4. Press S302 on SS-48P board to select "SERVO ADJUST" mode.
5. Move ∗ mark to "B110: RF SWITCHING POS." which is displaying on the monitor screen with the search dial.
6. Press S302 on SS-48P board to execute "RF SWITCHING POS." menu.
7. Move ∗ mark to "AUTO ADJUST" which is displaying on the monitor screen with the search dial.
8. Press S302 on SS-48P board to execute "AUTO ADJUST" menu.
9. Confirm that the message "SET CR2-1 ALIGNMENT TAPE AND PUSH PLAY KEY" is displayed on the monitor screen.
10. Insert an alignment tape CR2-1B PS and press the PLAY button.
11. Make sure that the message "COMPLETE" is displayed on the monitor screen.
    When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
12. Move ∗ mark to "B117: NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
13. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
14. Move ∗ mark to "SAVE ALL ADJ. DATA" with the search dial.

S601-1, 4/SS-48P : CLOSE

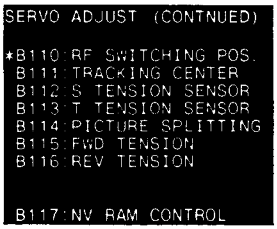
press S302



```
   MAINTENANCE MODE

  A0 : VIDEO CHECK
  B0 : SERVO CHECK
* B1 : SERVO ADJUST
  C0 : DT CHECK
  C1 : DT ADJUST
  F  : OTHERS
```

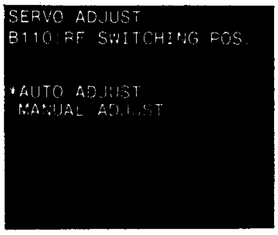
select with search dial

press S302



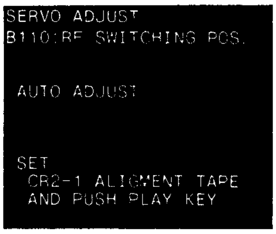
```
SERVO ADJUST (CONTNUED)

*B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


 B117:NV RAM CONTROL
```

press S302



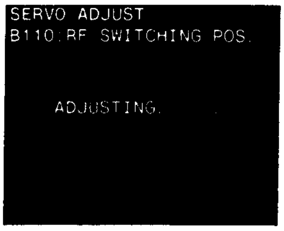
```
SERVO ADJUST
B110:RF SWITCHING POS.

*AUTO ADJUST
 MANUAL ADJUST
```

press S302



```
SERVO ADJUST
B110:RF SWITCHING POS.

 AUTO ADJUST


 SET
  CR2-1 ALIGMENT TAPE
  AND PUSH PLAY KEY
```

insert CR2-1B PS, and press pLAY button.

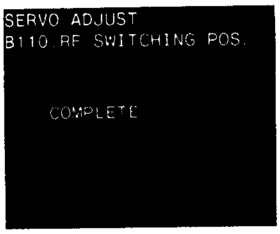


```
SERVO ADJUST
B110:RF SWITCHING POS.

    ADJUSTING.
```

15. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
16. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.

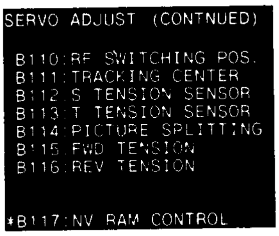
Note: When "INCOMPLETE" appears on the monitor screen in step (11), press S303 on SS-48P board to return to the menu screen. After that, press the EJECT button, take out the alignment tape, and make sure that it is CR2-1B PS.

17. Press the EJECT button and take out the alignment tape.
18. Turn the POWER to OFF and put Bit1 and Bit4 of S601 on SS-48P board to OPEN state.
19. After adjustment, perform RF switching position (DT head) adjustment refering to Section 6-13.



```
SERVO ADJUST
B110 RF SWITCHING POS.

COMPLETE
```

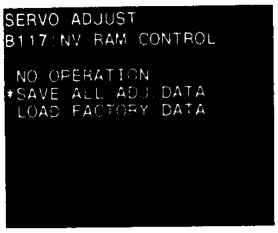
press S303



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113:T TENSION SENSOR
 B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION

*B117:NV RAM CONTROL
```

select with search dial

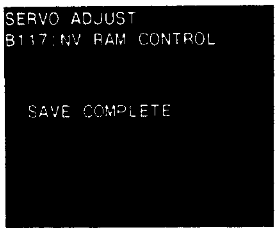
press S302



```
SERVO ADJUST
B117:NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ.DATA
 LOAD FACTORY DATA
```

select with search dial

press S302



```
SERVO ADJUST
B117:NV RAM CONTROL

 SAVE COMPLETE
```

press S303 twice

S601-1, 4/SS-48P : OPEN

6-13. RF SWITCHING POSITION ADJUSTMENT (DT HEAD)

Perform this switching position (DT head) adjustment when a video tracking adjustment is performed. Before performing this adjustment, RF switching position (RP head) adjustment is already completed.

Preparation

Connect a video monitor with VIDEO OUTPUT 3 connector or MONITOR connector, and display characters.

Tool

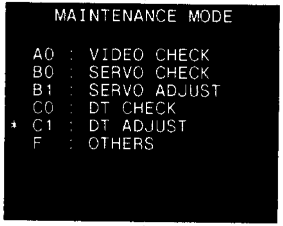
Alignment tape CR2-1B PS : 8-960-096-51

Check

1. Make sure that the unit is in EJECT mode. (The automatic adjustment does not accept the mode other than EJECT.)
2. Put Bits1, 2 and 5 of S2 on DT-30 board to ON state.
3. Press S302 on SS-48P board and put the unit into maintenance mode.
4. Press the search dial to enter the jog mode, and move * mark to "C1 : DT ADJUST" which is displaying on the monitor screen with the search dial.
5. Press S302 on SS-48P board to select "DT ADJUST" mode.
6. Move * mark to "C12 : DT Sw. POSITION" which is displaying on the monitor screen with the search dial.
7. Press S302 on SS-48P board to execute "DT Sw. POSITION" menu.
8. Make sure that the * mark is positioned to "Start auto adjust" which is displaying on the monitor screen.
9. Press S302 on SS-48P board.
10. Insert an alignment tape CR2-1B PS and press PLAY button.
11. Press S302 on SS-48P board again and execute "auto adjust" menu.
12. Make sure that the message "ADJUST COMPLETE" is displayed at the lower portion on the monitor screen.
    When "ADJUST COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
13. Move * mark to "C15 : Save adjust data" which is displaying on the monitor screen with the search dial.
14. Press S302 on SS-48P board to select "Save adjust data" menu.

S2-1, 2, 5/DT-30 : ON

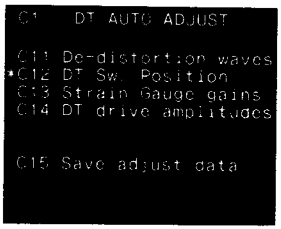
press S302



```
MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
 B1 : SERVO ADJUST
 C0 : DT CHECK
*C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

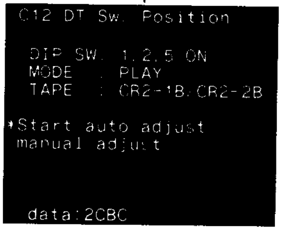
press S302



```
C1    DT AUTO ADJUST

 C11 De-distortion waves
*C12 DT Sw. Position
 C13 Strain Gauge gains
 C14 DT drive amplitudes


 C15 Save adjust data
```

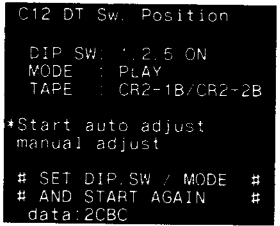
select with search dial

press S302



```
C12 DT Sw. Position

  DIP SW. 1,2,5 ON
  MODE  . PLAY
  TAPE  : CR2-1B/CR2-2B

*Start auto adjust
 manual adjust



  data:2CBC
```

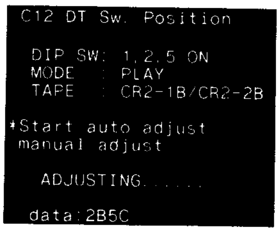
press S302



```
C12 DT Sw. Position

  DIP SW: 1,2,5 ON
  MODE  : PLAY
  TAPE  : CR2-1B/CR2-2B

*Start auto adjust
 manual adjust

 # SET DIP.SW / MODE  #
 # AND START AGAIN    #
  data:2CBC
```

insert CR2-1B PS, and
press PLAY button.

press S302



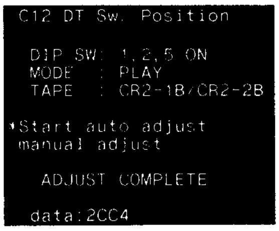
```
C12 DT Sw. Position

  DIP SW: 1,2,5 ON
  MODE  : PLAY
  TAPE  : CR2-1B/CR2-2B

*Start auto adjust
 manual adjust

   ADJUSTING......

  data:2B5C
```

15. Move * mark to "Save all adj. data" which is displaying on the monitor screen with the search dial.
16. Press S302 on SS-48P board. Data will be stored on the NV RAM.
17. When "SAVE COMPLATE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the menu screen.

Note 1 : When "INCOMPLATE" appears on the monitor screen in step (12), press S303 on SS-48P board to return to the menu screen.
After that, press EJCT button, take out the alignment tape, and make sure that it is CR2-1B PS.

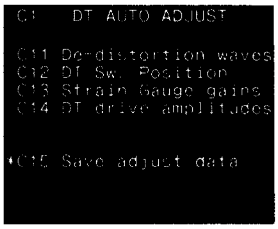
Note 2 : When the alignment tape is CR2-1B PS, perform "MANUAL ADJUST" referring the electrical adjustment in Section 9-2-2.

18. Press EJECT button and take out the alignment tape.
19. Turn OFF the POWER switch, and reset Bitsl, 2 and 5 of S2 on DT-30 board to OFF state.



```
C12 DT Sw. Position

 DIP SW: 1,2,5 ON
 MODE  : PLAY
 TAPE  : CR2-1B/CR2-2B

*Start auto adjust
 manual adjust

  ADJUST COMPLETE

 data:2CC4
```

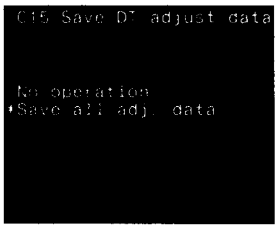
press S303



```
C1   DT AUTO ADJUST

C11 De-distortion waves
C12 DT Sw. Position
C13 Strain Gauge gains
C14 DT drive amplitudes


*C15 Save adjust data
```

select with search dial

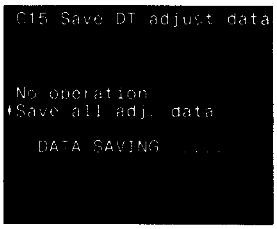
press S302



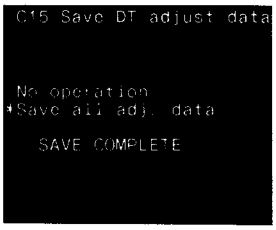
```
C15 Save DT adjust data


No operation
*Save all adj. data
```

select with search dial

press S302



```
C15 Save DT adjust data


No operation
*Save all adj. data

  DATA SAVING ....
```



```
C15 Save DT adjust data


No operation
*Save all adj. data

  SAVE COMPLETE
```

press S303 twice

press EJECT button,
and take out tape.

S2-1, 2, 5/DT-30: OFF

6-14. VIDEO HEAD DIHEDRAL CHECK

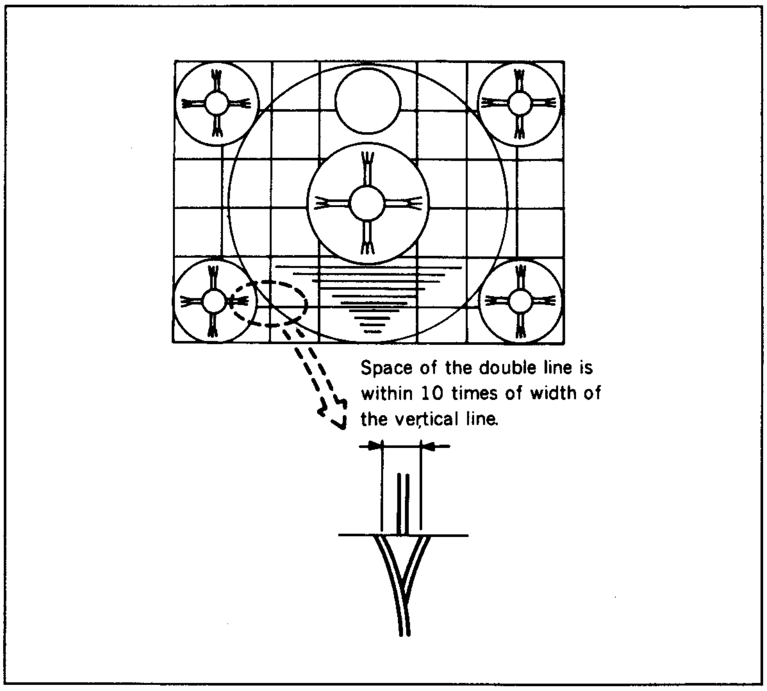
The video head dihedral of an upper drum assembly and drum assembly for service part is precisely adjusted at the factory. No adjustment is thus required. Perform only the check.

Tools

Alignment tape CR5-2A PS : 8-960-098-44
Monitor TV

Check flow chart

Confirmation of video head dihedral


Space of the double line is within 10 times of width of the vertical line.

Check

1. Connect a monitor TV to TP204 on VP-33BP board.
2. Insert an alignment tape CR5-2A PS into the unit and play back the monoscope signal portion.
3. Make sure if the vertical line of the monoscope signal just beneath a switching pulse is played back in double lines instead of a single line.
   Make sure that the space of the double line is within 10 times of width of the vertical line.

6-15. PICTURE SPLITTING COMPENSATION ADJUSTMENT

This picture splitting compensation adjustment is usually not required.
Picture splitting is rarely detected on the monitor TV that is connected to the connector on the connector panel. Perform this adjustment only when the picture splitting is detected. The picture splitting is the phenomenon shown in the figure.

Tools

Conventional monitor TV for checking
Alignment tape CR5-2A PS : 8-960-098-44
For adjustment purpose: monitor TV (Use a monitor whose AFC lock is slow.)

Adjustment flow chart

Adjustment of picture splitting compensation

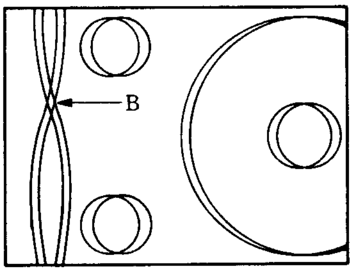
Check

1. Connect a conventional monitor TV to the connector on the connector panel.
2. Insert an alignment tape CR5-2A PS into the unit and play back the monoscope signal portion.
3. Check whether picture splitting is detected on the monitor TV.

Specification : 1.5 μs or less
If picture splitting is detected, perform steps (4) and later.

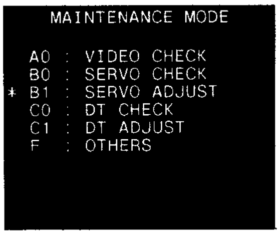
Adjustment

4. Connect a monitor TV for adjustment purpose to TP204 on VP-33BP board.
5. Connect a conventional monitor TV with VIDEO OUTPUT 3 connector or MONITOR connector on the connector panel.
6. Put the monitor TV into H DELAY, AFC FAST, and SYNC INT modes.
7. Make sure that the unit is in EJECT mode.
8. Put Bit4 of S601 on SS-48P board to CLOSE state. Press S302 and put the unit into maintenance mode.
9. Press the search dial to enter the jog mode, and move ∗ mark to "B1 : SERVO ADJUST" which is displaying on the monitor screen with the search dial.
10. Press S302 on SS-48P board to select " SERVO ADJUST" mode.
11. Move ∗ mark to "B114: PICTURE SPLITTING" in the menu which is displaying on the monitor screen with the search dial.



S601-4/SS-48P:CLOSE

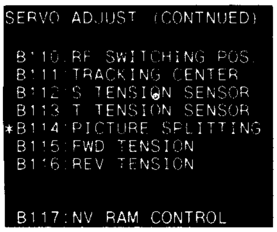
↓ press S302



```
MAINTENANCE MODE

 A0 : VIDEO CHECK
 B0 : SERVO CHECK
* B1 : SERVO ADJUST
 C0 : DT CHECK
 C1 : DT ADJUST
 F  : OTHERS
```

select with search dial

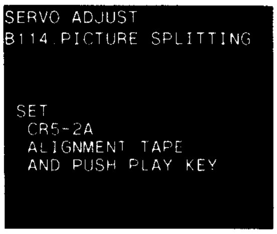
↓ press S302



```
SERVO ADJUST (CONTNUED)

 B110:RF SWITCHING POS.
 B111:TRACKING CENTER
 B112:S TENSION SENSOR
 B113 T TENSION SENSOR
*B114:PICTURE SPLITTING
 B115:FWD TENSION
 B116:REV TENSION


 B117:NV RAM CONTROL
```

select with search dial

↓ press S302



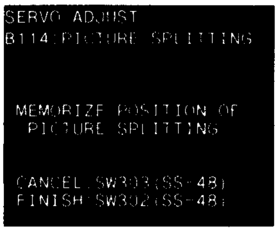
```
SERVO ADJUST
B114.PICTURE SPLITTING



 SET
  CR5-2A
  ALIGNMENT TAPE
  AND PUSH PLAY KEY
```

↓

insert CR5-2A PS, and
press PLAY button.

↓

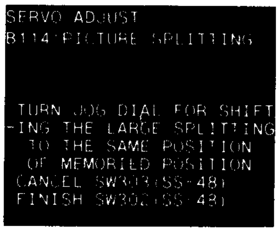
12. Press S302 on SS-48P board to execute "PICTURE SPLITTING" menu.
13. Insert an alignment tape CR5-2A PS into the unit and play back the monoscope signal portion.
14. Mark the "B" position shown in the figure on the monitor screen with felt pen.
15. Press S302 on SS-48P board.
16. Turn the search dial so that the picture splitting cross-point position of a picture played back on the monitor screen coincides with the position marked in step ⒁.
17. Press S302 on SS-48P board.
18. Turn the search dial so that minimize the picture splitting, and press S302 on SS-48P board.
19. Make sure that the message "COMPLETE" is displayed on the monitor screen that is connected with VIDEO OUTPUT 3 connector or MONITOR connector.
20. When "COMPLETE" is displayed on the monitor screen, press S303 on SS-48P board to return to the menu screen.
21. Move * mark to "B117 : NV RAM CONTROL" which is displaying on the monitor screen with the search dial.
22. Press S302 on SS-48P board to execute "NV RAM CONTROL" menu.
23. Move * mark to "SAVE ALL ADJ. DATA" with the search dial.
24. Press S302 on SS-48P board. Data will be stored on the NOV RAM.
25. When "SAVE COMPLETE" is displayed on the monitor screen, press S303 twice on SS-48P board to return to the mode screen.



```
SERVO ADJUST
B114:PICTURE SPLITTING

 MEMORIZE POSITION OF
  PICTURE SPLITTING

 CANCEL SW303(SS-48)
 FINISH SW302(SS-48)
```

mark the "B" position on the monitor screen

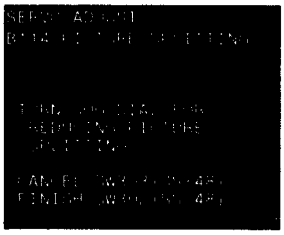
press S302



```
SERVO ADJUST
B114:PICTURE SPLITTING

 TURN JOG DIAL FOR SHIFT
-ING THE LARGE SPLITTING
  TO THE SAME POSITION
  OF MEMORIED POSITION
 CANCEL SW303(SS-48)
 FINISH SW302(SS-48)
```

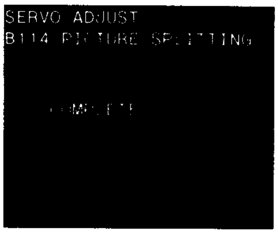
turn the search dial, and perform adjustment

press S302



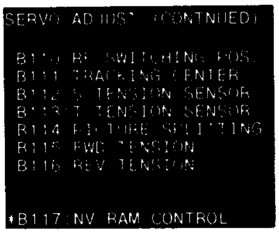
```
SERVO ADJUST
B114 PICTURE SPLITTING

 TURN [illegible] DIAL FOR
  [illegible]
  [illegible]

 CANCEL SW303(SS-48)
 FINISH SW302(SS-48)
```

press S302



```
SERVO ADJUST
B114 PICTURE SPLITTING

     COMPLETE
```

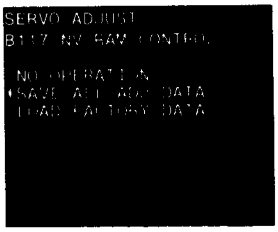
press S303



```
SERVO ADJUST (CONTNUED)

 B110 RF SWITCHING POS.
 B111 TRACKING CENTER
 B112 S TENSION SENSOR
 B113 T TENSION SENSOR
 B114 RF TUBE SPLITTING
 B115 FWD TENSION
 B116 REV TENSION


*B117:NV RAM CONTROL
```

select with
search dial

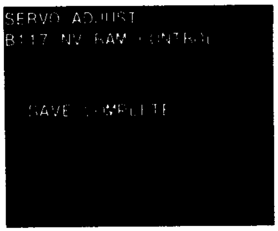
press S302



```
SERVO ADJUST
B117 NV RAM CONTROL

 NO OPERATION
*SAVE ALL ADJ DATA
 LOAD FACTORY DATA
```

select with
search dial

press S302



```
SERVO ADJUST
B117 NV RAM CONTROL



  SAVE COMPLETE
```

press S303 twice

S601-4/SS-48P : OPEN

SECTION 7
GENERAL INFORMATION FOR ELECTRICAL ADJUSTMENT

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AU-149 board

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RV710	HUE	11-44
RV711	4Fsc FREQ.	11-43

VP-33 board

RV102	YA OXIDE F.RESP.	11-31
RV103	YB OXIDE F.RESP.	11-31
RV106	YA METAL F.RESP.	11-30
RV107	YB METAL F.RESP.	11-30
RV108	Y OXIDE RF LEVEL	11-16
RV109	Y METAL RF LEVEL	11-15
RV111	VIDEO METER	11-15
RV112	Y METAL DO	11-34
RV113	Y OXIDE DO	11-34
RV201	Y LIMITER BALANCE	11-20
RV202	Y METAL OMC	11-28
RV203	Y OXIDE OMC	11-29
RV204	Y METAL DEMOD GAIN	11-18
RV205	Y OXIDE DEMOD GAIN	11-19
RV206	Y DEMOD BALANCE	11-24

RV402	CA OXIDE F.RESP.	11-33
RV403	CB OXIDE F.RESP.	11-33
RV406	CA METAL F.RESP.	11-32
RV407	CB METAL F.RESP.	11-32
RV408	C OXIDE RF LEVEL	11-17
RV409	C METAL RF LEVEL	11-17
RV412	C METAL DO	11-36
RV413	C OXIDE DO	11-36
RV501	C LIMITER BALANCE	11-22
RV502	C METAL OMC	11-28
RV503	C OXIDE OMC	11-29
RV504	C METAL DEMOD GAIN	11-18
RV505	C OXIDE DEMOD GAIN	11-19
RV506	C DEMOD BALANCE	11-26
RV701	PRE Y LEVEL	11-46
RV703	Y OUT LEVEL	11-47
RV704	S VIDEO Y LEVEL	11-47
RV705	VIDEO OUT LEVEL	11-48
RV706	VIDEO OUT SYNC	11-48
RV707	S VIDEO SYNC	11-47
RV708	Y OUT SYNC	11-47
RV709	VIDEO 3 LEVEL	11-48
RV712	BURST LEVEL	11-54
RV713	V SC LEAK	11-53
RV714	U SC LEAK	11-53
RV715	ENC B-Y LEVEL	11-54
RV716	ENC R-Y LEVEL	11-54
RV718	CF ADJ	12-22
RV719	VISC LEVEL	11-52
RV720	VISC DC	11-52
RV721	R-Y DELAY	12-21
RV722	R-Y LEVEL	11-49
RV723	B-Y DELAY	12-21
RV724	B-Y LEVEL	11-50
RV725	ID(+)LEVEL	11-51
RV726	ID(−)LEVEL	11-51

7-2. REQUIRED EQUIPMENT

VIDEO system equipments

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-300(BETACAM SP SPEC.)	for BETACAM SP
	Composite	TEKTRONIX 1411	
	Digital Composite	TEKTRONIX 271	SCH reference
Network Analyzer		ANRITSU MS-420B	use together with head coupling tool
Waveform Monitor	Component	TEKTRONIX WFM300/WFM300A/1781R	
	Composite	TEKTRONIX 1481C/1751/1781R	with SCH meter
Spectrum analyzer		ADVANTEST R4131B/D	
Picture Monitor			
Head Coupling Tool			
Frequency Counter		ADVANTEST TR5821AK	
Blank Tape (Oxide)		BCT-20G	standard products
Blank Tape (Metal)		BCT-20M	standard products
Alignment Tape		CR5-1B PS(PART No. 8-960-096-91)	refer to Section 11, 12 Video System Alignment
Alignment Tape		CR5-2A PS(PART No. 8-960-098-44)	refer to Section 11, 12 Video System Alignment

AUDIO/TIME CODE system equipments

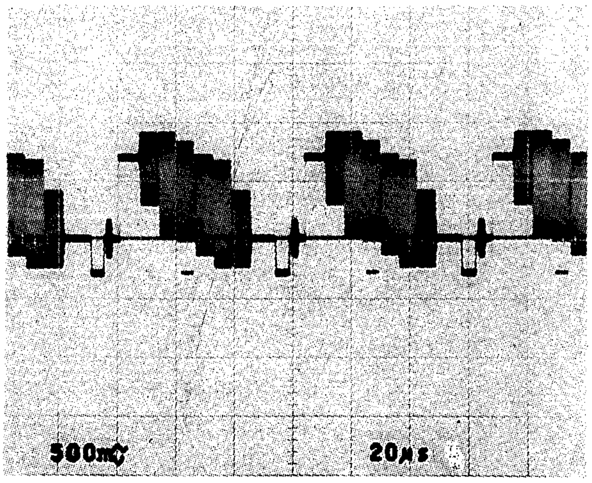
Equipment	Equivalent	Note
Oscilloscope	TEKTRONIX 2445	
Picture Monitor		
Audio Level Meter	HP 3400A	
Alignment Tape	CR8-1A PS(PART No. 8-960-098-45)	refer to Section 10 Audio/Time Code System Alignment
	CR8-1B PS(PART No. 8-960-096-86)	

Others

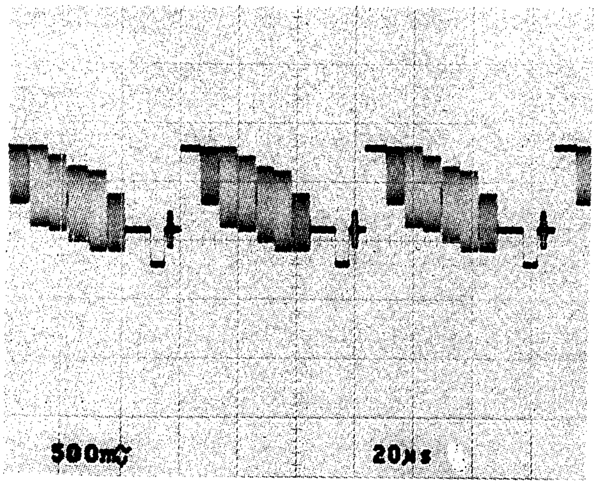
Equipment	Equivalent	Note
Digital Voltmeter	ADVANTEST TR6845	refer to 8-1. switching regulator adjustment

7-3. TEST SIGNAL

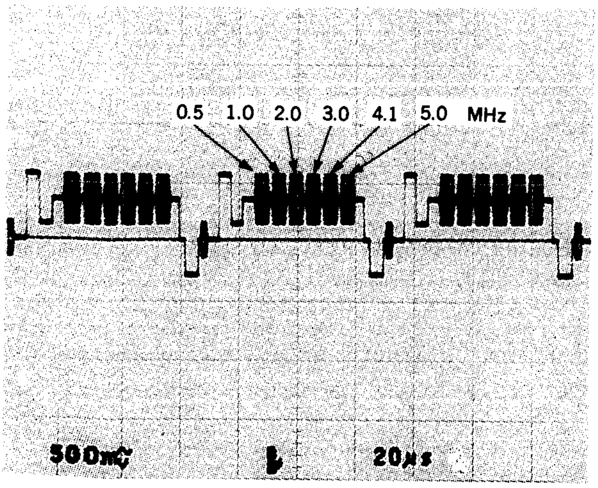
1. 100% COLOR BARS



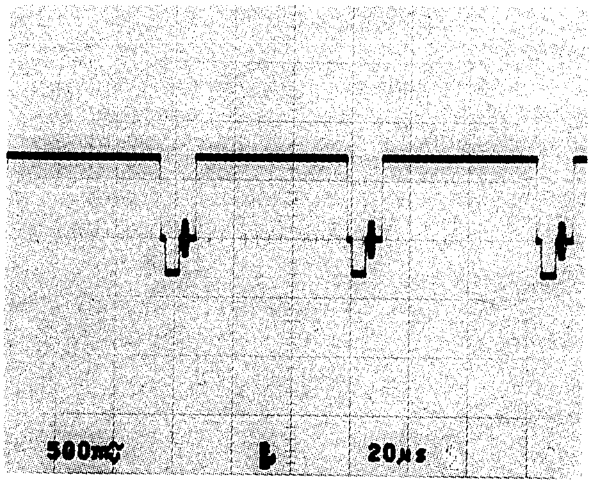
2. 75% COLOR BARS



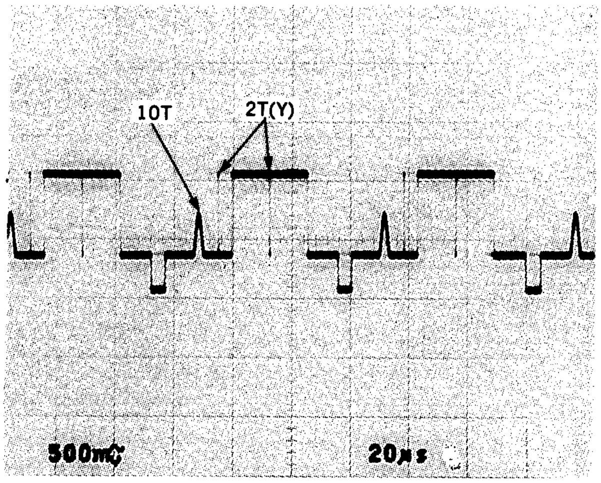
3. 60% MULTI BURST



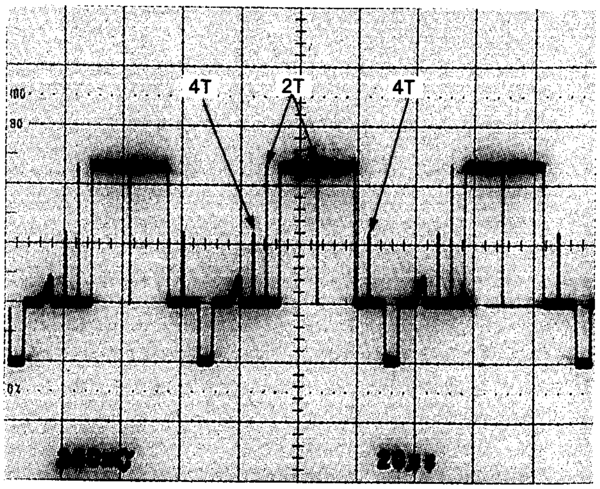
4. 50% FLAT FIELD



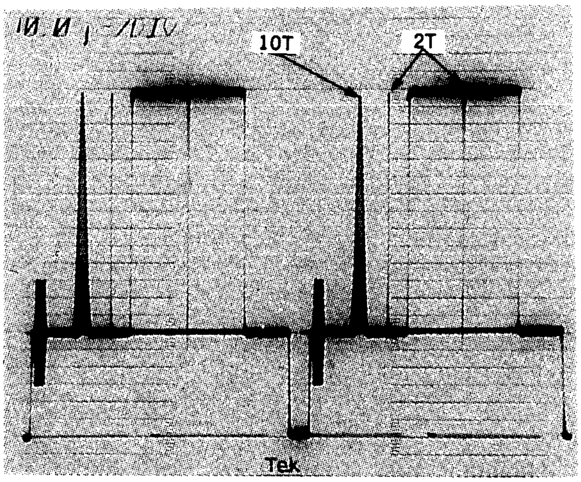
5. PULSE & BAR (COMPONENT) 2T(Y)



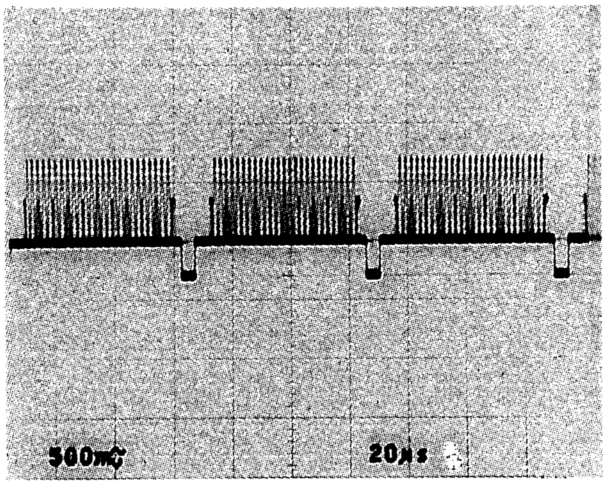
6. PULSE & BAR (COMPONENT) 2T, 4T (Y)



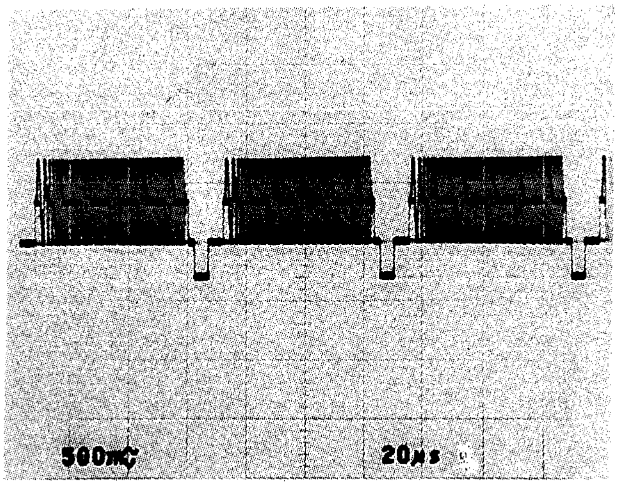
7. PULSE & BAR (COMPOSITE) 2T



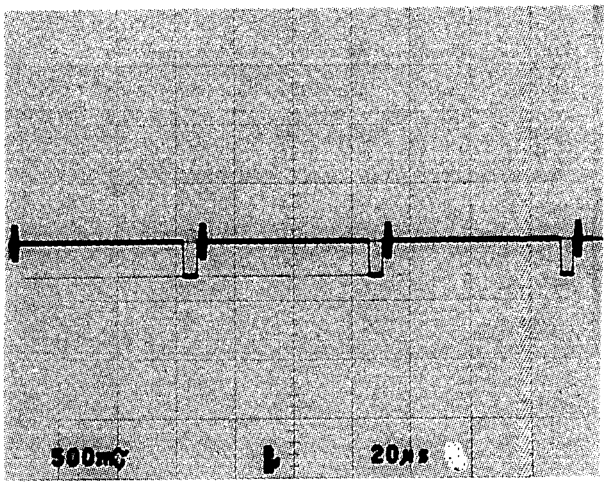
8. 50% BOWTIE



9. 100% NARROW LINE SWEEP (200 kHz—5.5 MHz)



10. BLACK BURST



SECTION 8
POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

[Equipment Required]

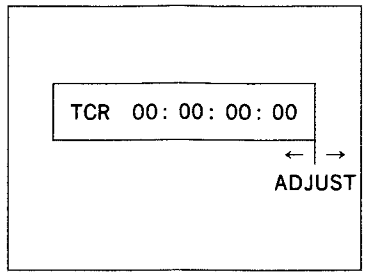
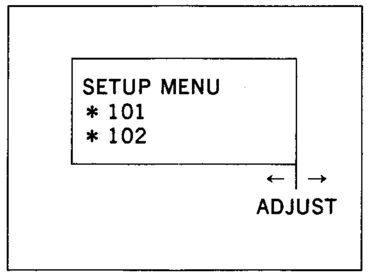
- Digital Voltmeter (ADVANTEST TR6845)
- Picture Monitor
- Alignment Tape CR5-2A PS (Part No. 8-960-098-44)
  Contents

TIME min s	VIDEO TRACK
0: 00	75% Color Bars
3: 00	60% Multi Burst Y: 0.5,1.0,2.0,3.0,4.1,4.5 MHz C: 0.2,0.5,1.0,1.5,2.0 MHz
6: 00	50% Bowtie & 10T
9: 00	Pulse & Bar
11: 00	Quad Phase
13: 00	Composite Monoscope
15: 00	

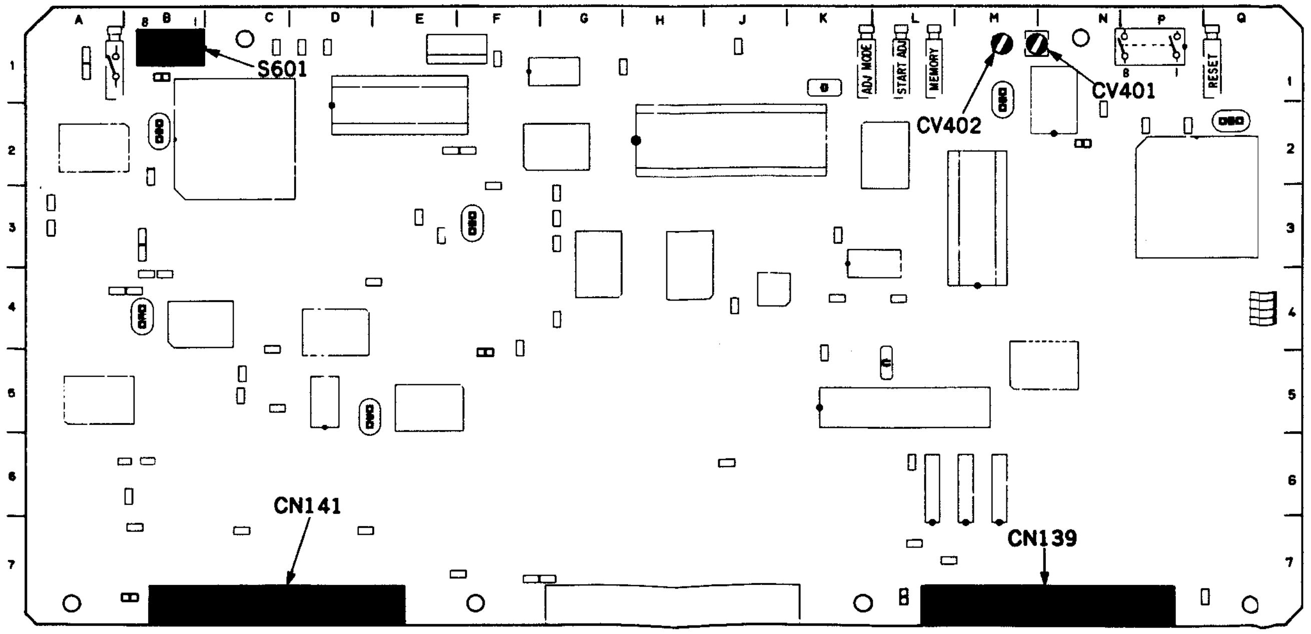
8-1. SWITCHING REGULATOR VOLTAGE CHECK

Preparations for adjustment	Specifications	Adjustment
• Set the bit 1 through 8 of S601 (B-1) on the SS-48 board to ON. **NOTE:** When checking, be careful not to short between connector pins. • After adjustment is completed, set the bit 1 through 8 of S601 (B-1) on the SS-48 board to OFF.	Use the digital voltmeter CN139-46pin/SS-48 $+5.1\pm0.25$ V CN139-44pin/SS-48 $+8.0^{+1.0}_{-0.6}$ V CN139-42pin/SS-48 $-5.1^{+0.25}_{-0.6}$ V CN141-5Apin/SS-48 $-13.0^{+0.5}_{-0.75}$ V CN141-4Apin/SS-48 $+13.0\pm0.5$ V	(CHECK)

8-2. CHARACTER POSITION ADJUSTMENT

Preparations for adjustment	Specifications	Adjustment
Step 1 • Connect the picture monitor to VIDEO OUTPUT 3 connector. • CHARACTER switch (sub control panel): ON • CTL/TC/U-BIT switch (control panel): CTL • Play back the composite mono scope signal portion (13: 00—15: 00) of the alignment tape CR5-2A PS.	Adjust the CTL character display, and position the right side frame at the same scale which positioned the left side frame in the monoscope picture on the monitor. 	⊘CV401/SS-48(M-1)
Step 2 • Press the SYSTEM SET-UP MENU button on the sub control panel once. • After adjustment is completed, press the SYSTEM SET-UP MENU button and display the original picture.	Adjust the setup menu display, and position the right side frame at the same scale which positioned the left side frame in the monoscope picture on the monitor. 	⊘CV402/SS-48(M-1)

SS-48 board



SECTION 9
SERVO SYSTEM ALIGNMENT

NOTE: There are relative items about servo system alignment in section 3, 5 and 6. If necessary, refer to them.

[Equipment Required]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Picture Monitor
- Alignment Tape CR2-1B PS (Part No. 8-960-096-51)

Contents

VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL
Y; 4 MHz Signal C; 5 MHz Signal	Blank	Blank	CTL

- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

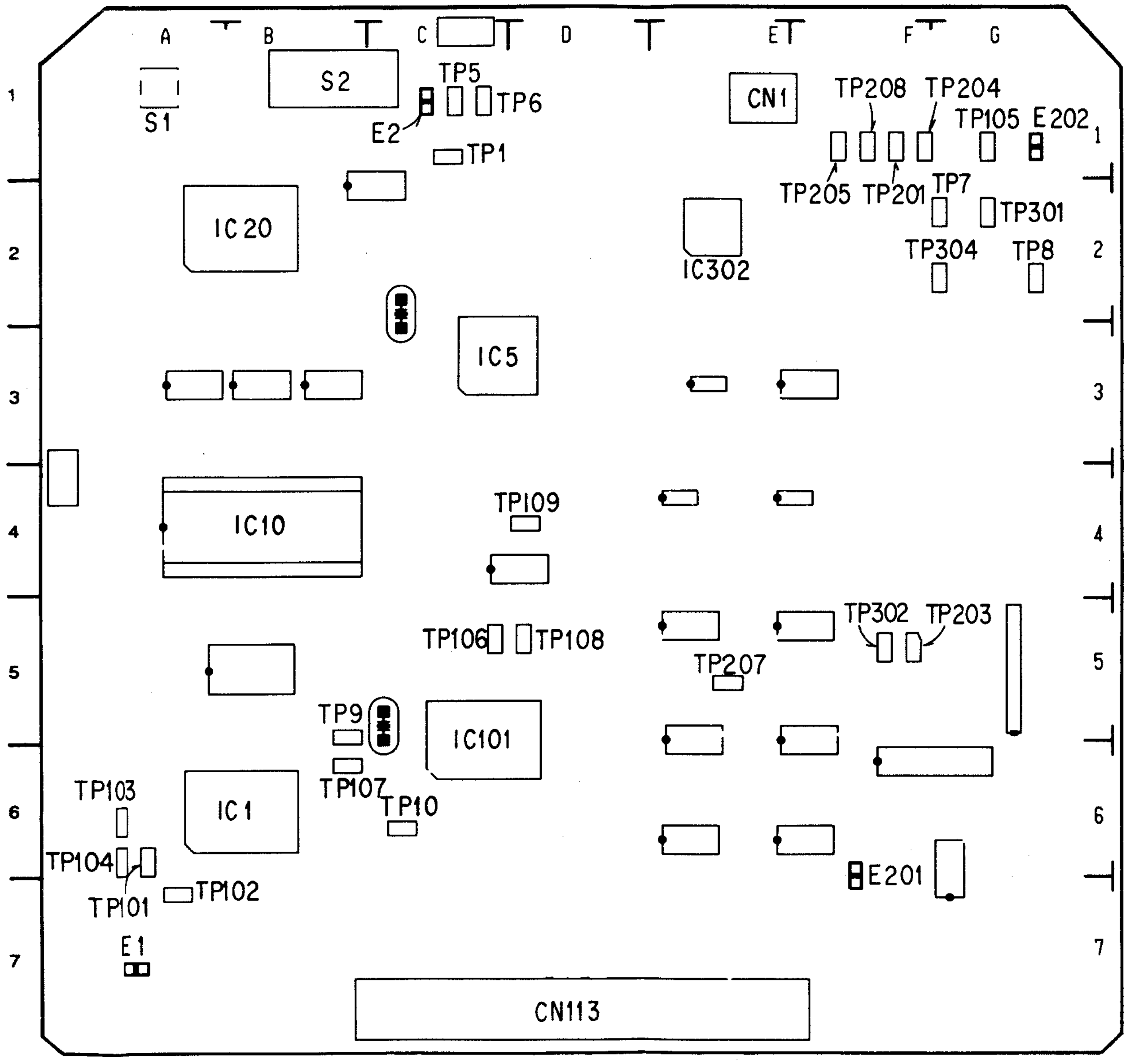
Contents

TIME min s	VIDEO TRACK	AFM
0: 00	RF Sweep Marker 1,2,4,6,8,10,12 MHz	No-Signal
2: 00	60% H Sweep (CTDM) Marker 0.5,1,2,3,4,5 MHz	
5: 00	Pulse & Bar (CTDM)	
8: 00	Multi Burst Y: 0.5,1,2,4,5,5.5 MHz C: 0.2, 0.5,1,1.5,2 MHz	
11: 00	Pulse & Bar	
14: 00	100% Color Bars	400 Hz SINE WAVE 25 kHz DEVIATION
16: 30		75 kHz DEVIATION
17: 00	50% Bowtie & 10T	No-Signal
19: 00	Line 17A	
22: 00	Quad Phase	
24: 00	50% Flat Field	
26: 00	100% Color Bars with Dropout	
28: 00	Composite H Sweep with VISC	
30: 00		

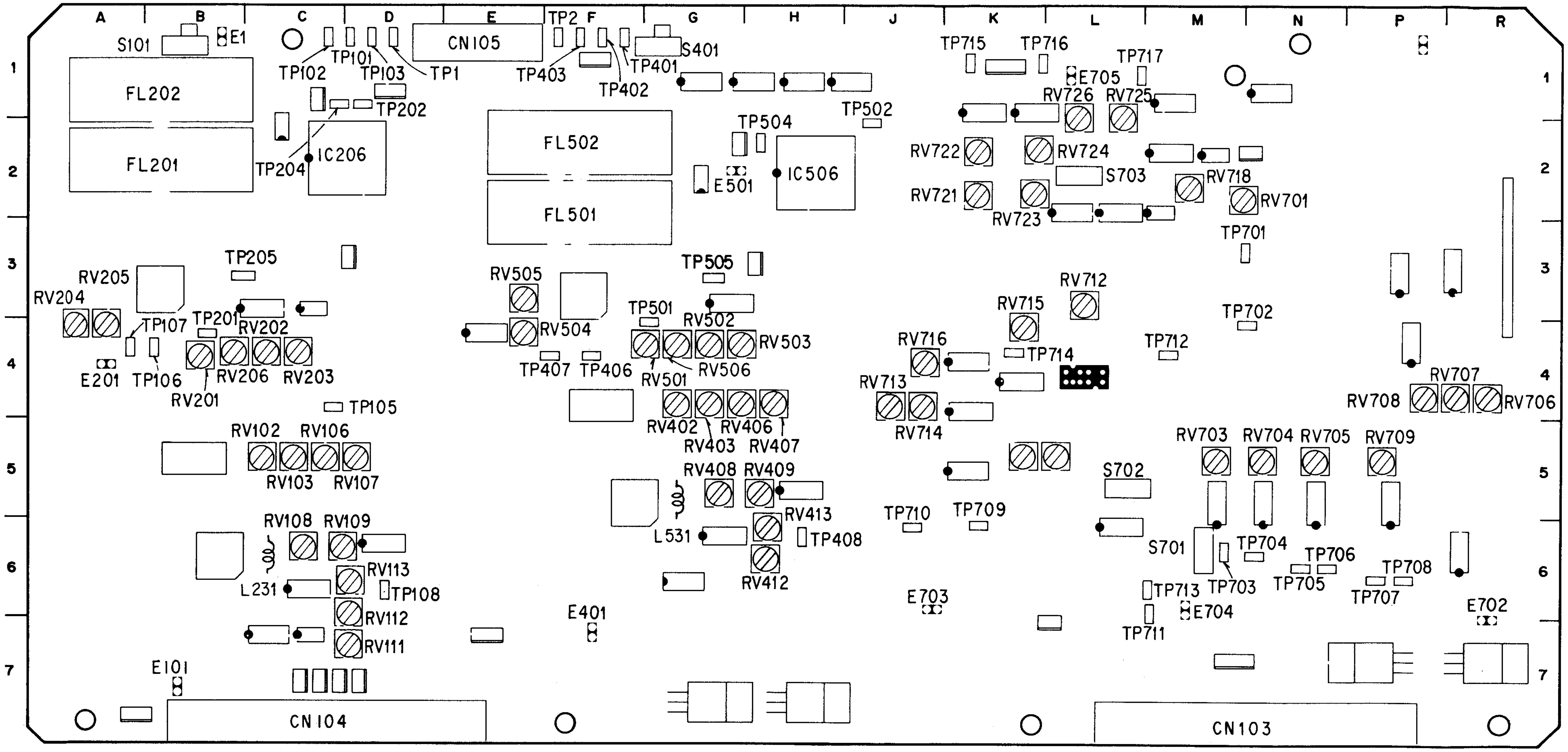
- Alignment Tape CR5-2A PS (Part No. 8-960-098-44)
  Contents

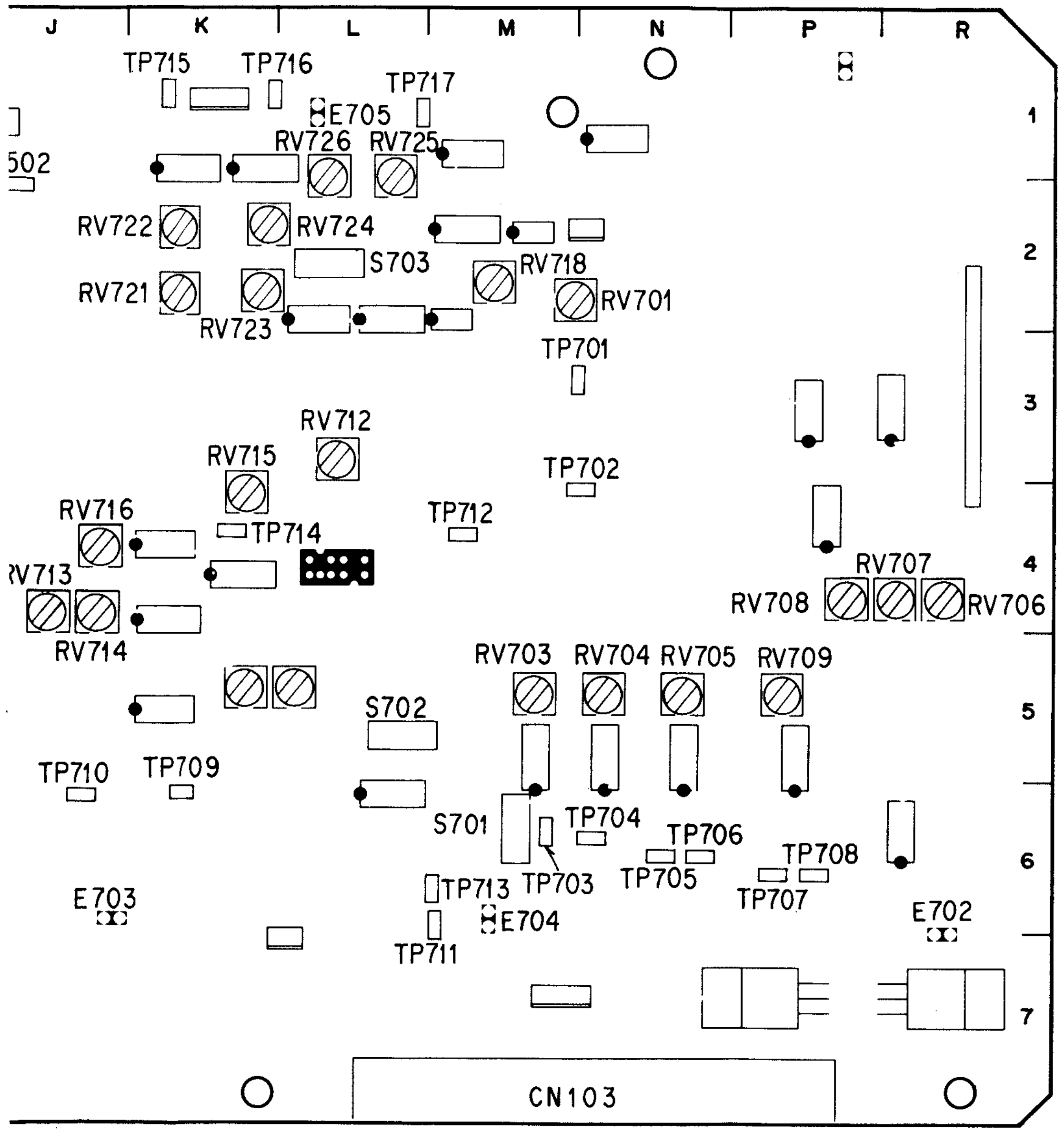
TIME min. s	VIDEO TRACK
0: 00	75% Color Bars
3: 00	60% Multi Burst Y: 0.5,1.0,2.0,3.0,4.1,4.5 MHz C: 0.2,0.5,1.0,1.5,2.0 MHz
6: 00	50% Bowtie & 10T
9: 00	Pulse & Bar
11: 00	Quad Phase
13: 00	Composite Monoscope
15: 00	

DT-30 board (A Side)


A
B
C
D
E
F
G
1
2
3
4
5
6
7
S1
S2
TP5
TP6
E2
TP1
CN1
TP208
TP204
TP105
E202
TP205
TP201
TP7
TP301
TP304
TP8
IC20
IC302
IC5
IC10
TP109
TP106
TP108
TP302
TP203
TP207
TP9
IC101
TP103
IC1
TP107
TP10
TP104
TP101
TP102
E201
E1
CN113

VP-33 board (A side)


A
B
C
D
E
TP2
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
7
S101
E1
CN105
S401
TP102
TP101
TP103
TP1
TP403
TP402
TP401
TP202
TP204
IC206
FL202
FL201
FL502
FL501
TP504
TP502
E501
IC506
TP715
TP716
TP717
E705
RV726
RV725
RV722
RV724
S703
RV721
RV723
RV718
RV701
TP701
TP205
RV205
RV204
TP107
TP201
RV202
E201
TP106
RV206
RV203
RV201
TP105
RV505
RV504
TP407
TP406
TP505
TP501
RV502
RV503
RV501
RV506
RV712
RV715
RV716
TP714
RV713
RV714
TP712
TP702
RV708
RV707
RV706
RV402
RV406
RV403
RV407
RV102
RV106
RV103
RV107
RV408
RV409
RV413
TP408
L531
RV412
RV703
RV704
RV705
RV709
S702
TP710
TP709
S701
TP704
TP706
TP703
TP705
TP708
TP707
TP713
E704
TP711
E703
E702
RV108
RV109
L231
RV113
TP108
RV112
RV111
E401
E101
CN104
CN103


J
K
L
M
N
P
R
1
2
3
4
5
6
7
TP715
TP716
TP717
E705
RV726
RV725
502
RV722
RV724
S703
RV718
RV701
RV721
RV723
TP701
RV712
RV715
TP702
RV716
TP712
TP714
RV707
RV713
RV708
RV706
RV714
RV703
RV704
RV705
RV709
S702
TP710
TP709
S701
TP704
TP706
TP708
TP713
TP703
TP705
TP707
E703
E702
E704
TP711
CN103

9-1. SEARCH DIAL ASSEMBLY SENSOR DUTY ADJUSTMENT

NOTE: This adjustment should be only performed if any parts are replaced on the PTC-39 board or if any RV is moved unintentionally.

Preparation:

(1) Remove the lower control panel ass'y. (Refer to Section 2-8.)
(2) Remove the rubber of a search dial. Then remove the screw on the dial and pull out the dial knob.
(3) Remove three screws on the lower control panel and remove the search dial.
(4) Remove one screw on the side of the search dial and remove a plastic cover.
(5) Install the lower control panel on the unit.
(6) Install the dial knob and rubber.
(7) Connect the harness to the connector CN1 on the PTC-39 board passing the hole of the control panel.
(8) Solder the test terminal for connecting a probe to CN1-2pin, 3pin and 6pin on the PTC-39 board.
(9) Fix the search dial on the control panel using a adhesive tape, so you can operate the dial by one hand.
(10) After adjustment is completed, install the dial and the panel.

Fig. 1

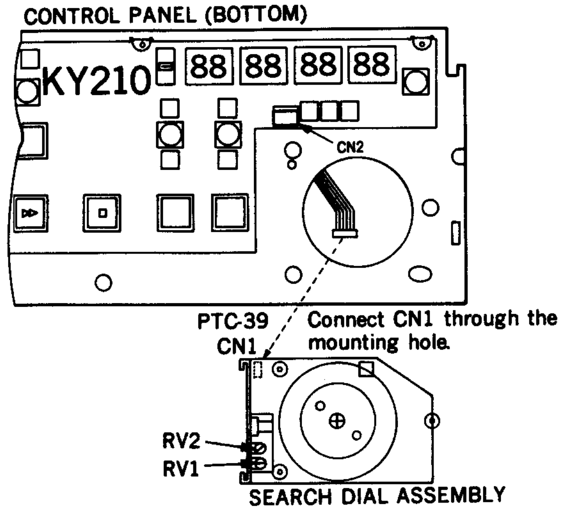
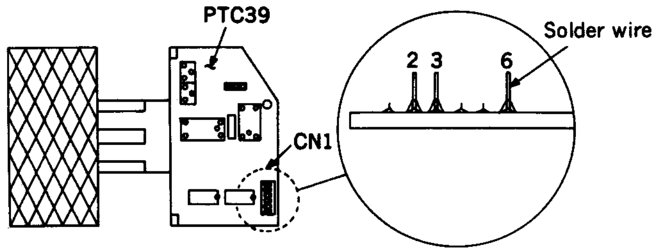
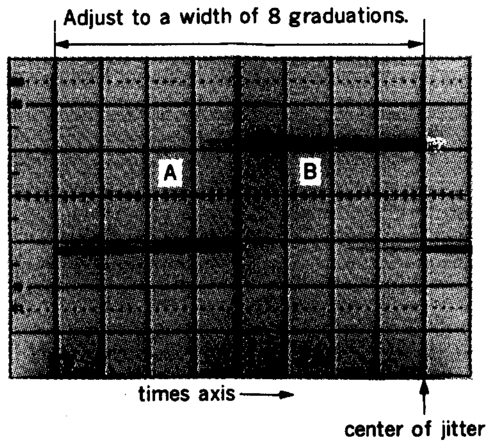
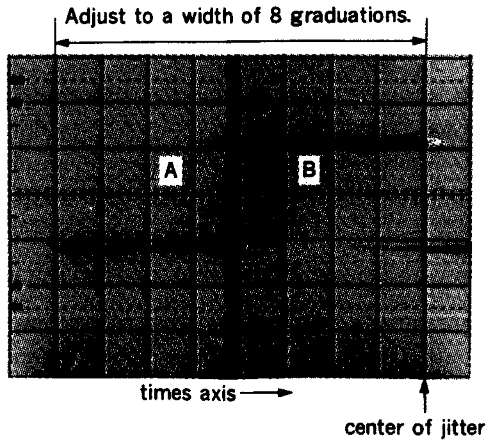


Fig. 2

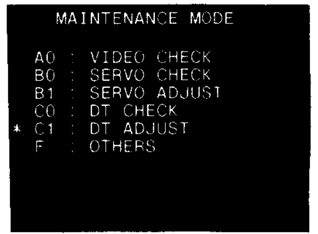
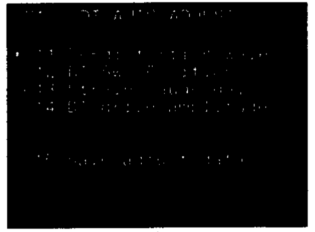
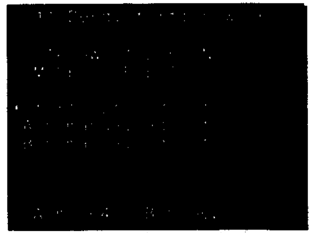
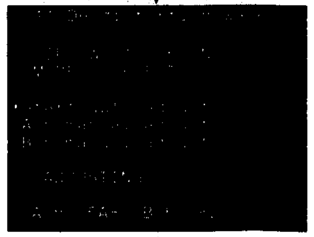
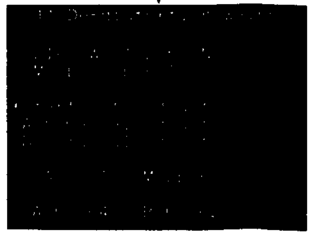


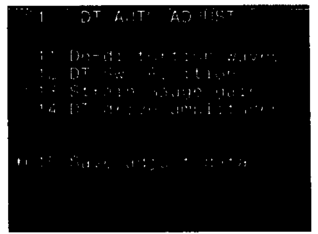
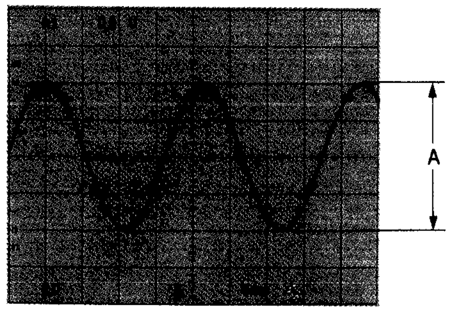
Preparations for adjustment	Specifications	Adjustment
Step 1 • Connect the HOT side of the probe of the oscilloscope to CN1-2pin on the PTC-39 board of the search dial ass'y and the GND side to CN1-6pin. • Press the search dial to put the unit into jog mode. • Oscilloscope VOLTS/div: 2 V SEC/div: 2 ms TRIGGER/SLOPE: − • Turn the H position control of the oscilloscope to position the rising of the beam at the first graduation from the left of the scale. • Turn and keep the search dial in the reverse direction at the constant speed. • Adjust the turning speed of the search dial so that the waveform of the oscilloscope has one cycle of 8 graduations on the scale.	 A: B=4.2: 3.8 (±5%)	●RV2/PTC-39
Step 2 • Connect the HOT side of the probe of the oscilloscope to CN1-3pin on the PTC-39 board and the GND side to CN1-6pin. • Press the search dial to put the unit into jog mode. • Oscilloscope VOLTS/div: 2 V SEC/div: 2 ms TRIGGER/SLOPE: − • Turn the H position control of the oscilloscope to position the rising of the beam at the first graduation from the left of the scale. • Turn and keep the search dial in the forward direction at the constant speed. • Adjust the turning speed of the search dial so that the waveform of the oscilloscope has one cycle of 8 graduations on the scale.	 A: B=4.2: 3.8 (±5%)	●RV1/PTC-39

9-2. DT SERVO ADJUSTMENT

Before adjustment, VP BOARD (RF, DM SYSTEM) ADJUSTMENT in Section 11-1 should be completed.

9-2-1. De-distortion Waves Adjustment

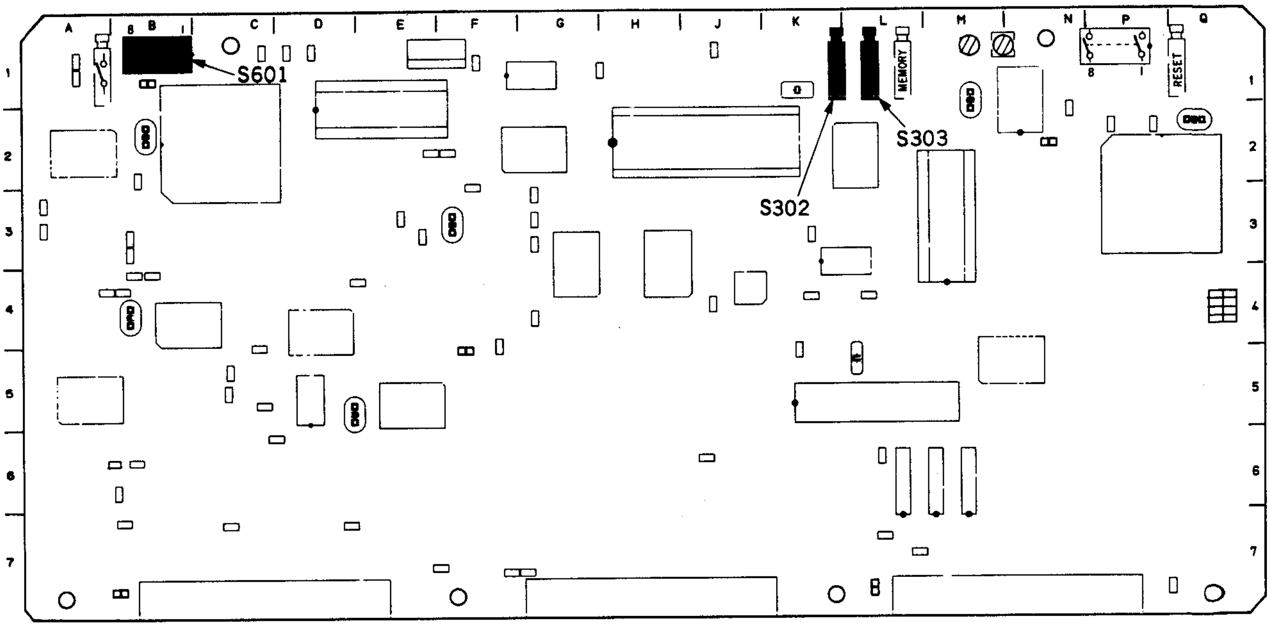
Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect a picture monitor to the VIDEO OUTPUT 3 connector or MONITOR connector. • CHARACTER switch (sub control panel): ON • S601-4/SS-48 (B-1): ON • S2-1, 2, 5/DT-30 (B-1): ON • EJECT completion state • Confirm that when turn on the power, D10/DT-30 (A-1) lights for some seconds and then it is put out. (1) Press S302/SS-48 (K-1) to put the unit into the maintenance mode. (2) Press the search dial to put the unit into the JOG mode, and move * mark to "C1: DT ADJUST". (3) Press S302/SS-48. (4) Move * mark to "C11: De-distortion waves". (5) Press S302/SS-48. (6) Move * mark to "Start auto adjust". (7) Press S302/SS-48 to execute the "auto adjust". (8) "ADJUSTING......" is displayed during execution, and value of the data that is displayed lower the picture monitor changes every moment. (9) "ADJUST COMPLETE" is displayed when adjustment is completed. (10) Press S303/SS-48 (L-1) to return to the menu picture.	MENU SELECTION picture monitor S601-4/SS-48 (B-1): ON S2-1, 2, 5/DT-30 (B-1): ON (1) ↓ press S302/SS-48 (K-1) (2)  MAINTENANCE MODE A0 : VIDEO CHECK B0 : SERVO CHECK B1 : SERVO ADJUST C0 : DT CHECK * C1 : DT ADJUST F : OTHERS select with search dial (3) ↓ press S302 (4)  (select with search dial) (5) ↓ press S302 (6)  (select with search dial) (7) ↓ press S302 (8)  ↓ (9)  (10) ↓ press S303/SS-48 (L-1)	(adjust by maintenance menu)

Preparations for adjustment	Specifications	Adjustments
Step 2 (11) Move * mark to "C15: Save adjust data". (12) Press S302/SS-48 (K-1). (13) Move * mark to "Save all adj. data". (14) Press S302/SS-48 to execute the "save all adj.data". (15) "SAVE COMPLETE" is displayed when save is completed. (16) Press S303/SS-48 (L-1) three times to close the maintenance mode.	↓ (11)  select with search dial (12) ↓ press S302/SS-48 (K-1) (13) select with search dial (14) ↓ press S302 (15) (16) ↓ press S303/SS-48 (L-1) three times	(save adjustment data)
Step 3 • S601-4/SS-48 (B-1): ON • S2-1, 2, 5/DT-30 (B-1): ON • EJECT mode • Press S1/DT-30 (A-1) to put the unit into the de-distortion mode. D10 (A-1) lights for a little. Observe waveform during it lighting. • After adjustment, set S601-4/SS-48 (B-1) and S2-1, 2, 5/DT-30 (B-1) to OFF.	CH-A: TP204 (DR A)/DT-30 (F-1) CH-B: TP208 (DR B)/DT-30 (F-1) oscilloscope  A=7.9±0.2 V p-p	(confirm waveform) TRIG: INT

NOTE: If "ADJUST COMPLETE" is not displayed in step 1, possible to manual adjust by mentioned below.

1. Move * mark to "Ach manual adjust" or "Bch manual adjust" at (6) in Step 1.
2. Press S1/DT-30 (A-1) to put the unit into the de-distortion mode, and then observe the waveform at the test point indicated in Step 3.
3. Adjust to meet the specification described in Step 3 by turn the search dial while pressing the SEARCH button.
4. After both channel's adjustments are completed, save adjustment data by Step 2. Set S601-4/SS-48 (B-1) and S2-1, 2, 5 /DT-30 (B-1) to OFF.

SS-48 board APPLICATION : 9-2-1.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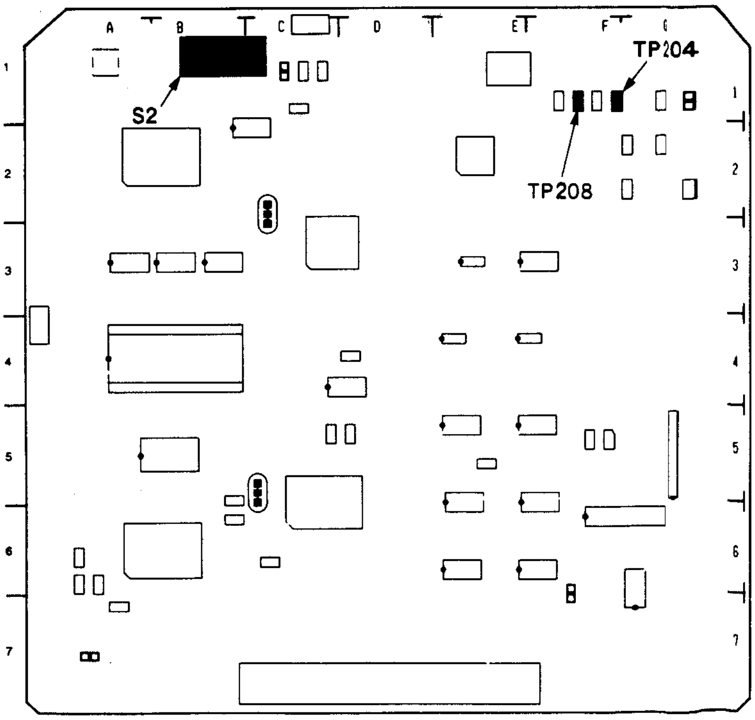
M
N
P
Q
1
2
3
4
5
6
7
S601
S302
S303
MEMORY
RESET

DT-30 board

APPLICATION : 9-2-1.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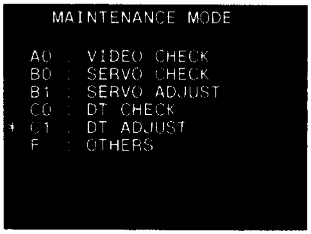
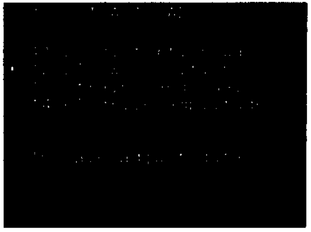
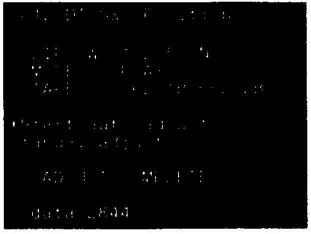
6
7
S2
TP204
TP208

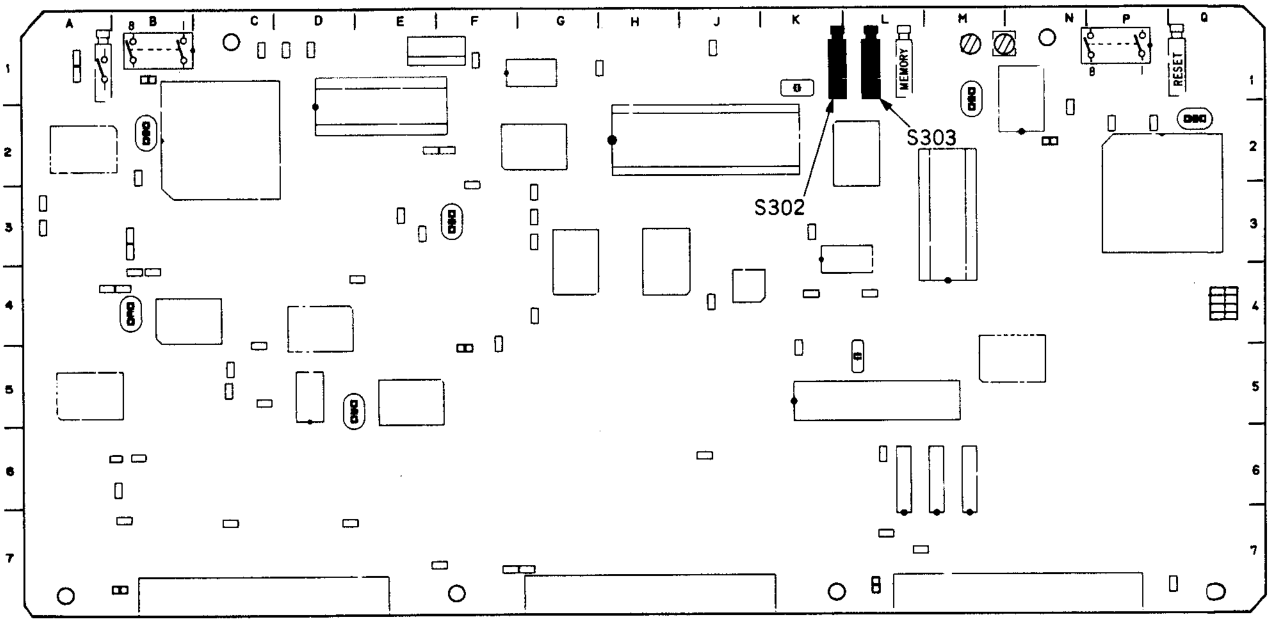
9-2-2. Y DT Switching Position Adjustment

Before adjustment, "B110: RF SWITCHING POS." adjustment in Section 3-3. SERVO SYSTEM CHECK MODE should be completed.

Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect a picture monitor to the VIDEO OUTPUT 3 connector or MONITOR connector. • CHARACTER switch (sub control panel): ON • S2-1, 2, 5/DT-30 (B-1): ON • Turn on the power in EJECT completion state. (1) Press S302/SS-48 (K-1) to put the unit into the maintenance mode. (2) Press search dial to put the unit into the JOG mode, and move * mark to "C1 : DT ADJUST". (3) Press S302/SS-48. (4) Move * mark to "C12: DT Sw. Position". (5) Press S302/SS-48. (6) Move * mark to "Start auto adjust". (7) Press S302/SS-48. (8) Insert the alignment tape CR2-1B PS, and then press the PLAY button. (9) Press S302/SS-48 to execute the "auto adjust". (10) After "ADJUST COMPLETE" is displayed, press the EJECT button to remove the alignment tape. (11) Press S303/SS-48 (L-1) to return to the menu picture.	MENU SELECTION picture monitor S2-1, 2, 5/DT-30 (B-1): ON (1) ↓ press S302/SS-48 (K-1) (2)  MAINTENANCE MODE A0 : VIDEO CHECK B0 : SERVO CHECK B1 : SERVO ADJUST C0 : DT CHECK * C1 : DT ADJUST F : OTHERS select with search dial (3) ↓ press S302 (4)  select with search dial (5) ↓ press S302 (6) (select with search dial) (7) ↓ press S302 (8) insert CR2-1B PS, then press PLAY button (9) ↓ press S302 (10)  press EJECT button to remove CR2-1B PS (11) ↓ press S303/SS-48 (L-1)	(adjust by maintenance menu)

Continues to the next page.

SS-48 board APPLICATION : 9-2-2. Step 1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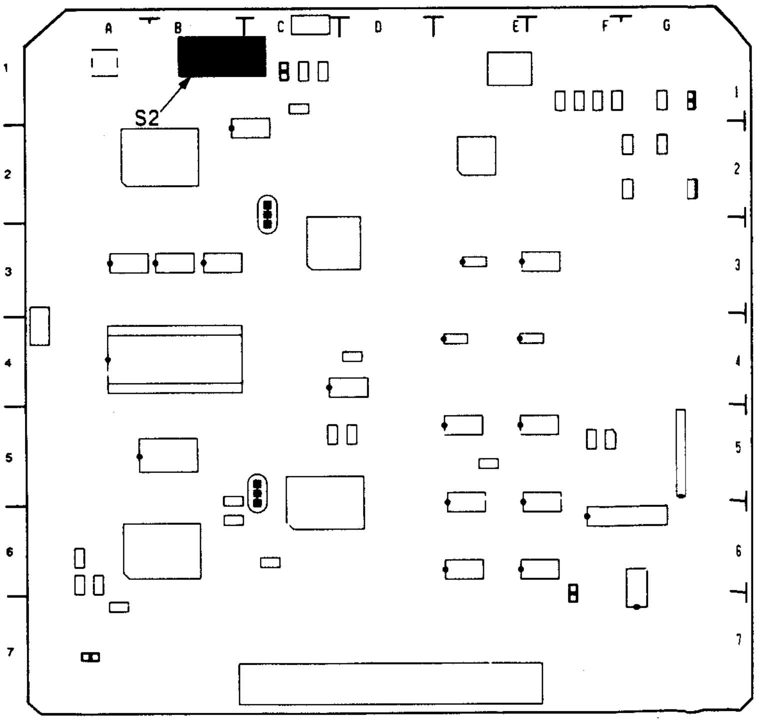
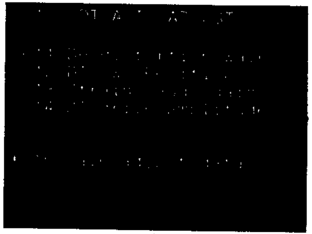
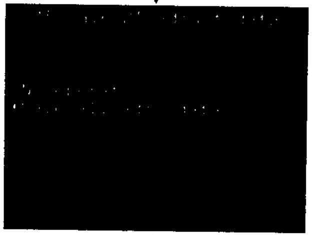
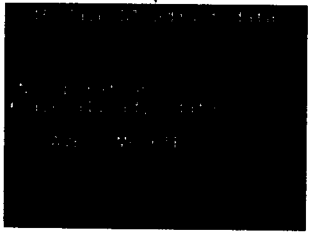
L
M
N
P
Q
1
2
3
4
5
6
7
MEMORY
RESET
S302
S303

DT-30 board

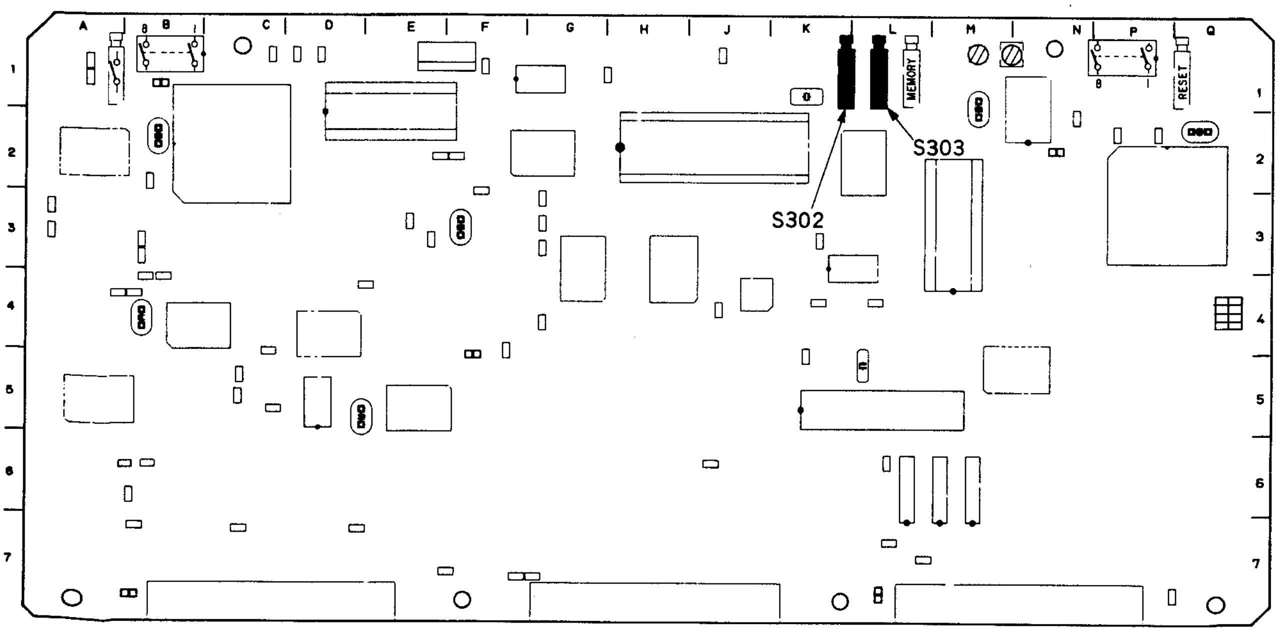
APPLICATION : 9-2-2. Step 1

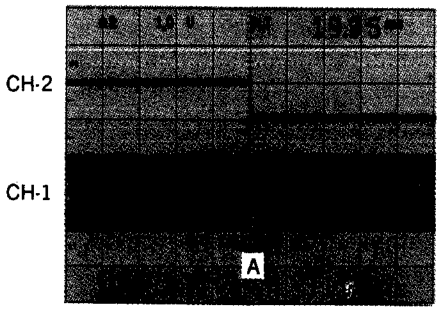
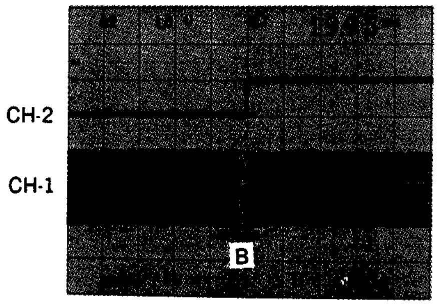
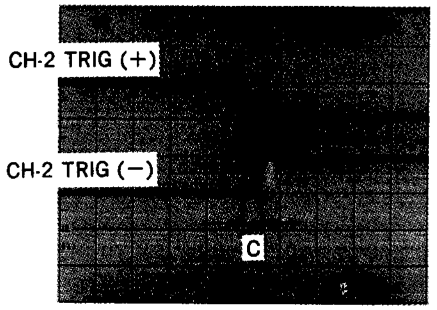

A
B
C
D
E
F
G
1
2
3
4
5
6
7
S2

9-2-2. Y DT Switching Position Adjustment (continued)

Preparations for adjustment	Specifications	Adjustments
Step 2 (12) Move ∗ mark to "C15: Save adjust data". (13) Press S302/SS-48 (K-1). (14) Move ∗ mark to "Save all adj. data". (15) Press S302/SS-48 to execute the "Save all adj.data". (16) "SAVE COMPLETE" is displayed when save is completed. (17) Press S303/SS-48 (L-1) three times to close the maintenance mode.	↓ (12)  select with search dial (13) ↓ press S302/SS-48 (K-1) (14)  select with search dial (15) ↓ press S302 (16)  (17) ↓ press S303/SS-48 (L-1) three times	(save adjustment data)

SS-48 board APPLICATION : 9-2-2. Step 2

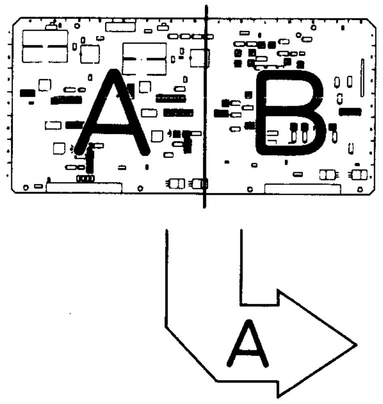


Preparations for adjustment	Specifications	Adjustments
Step 3 • S2-1, 2, 5/DT-30 (B-1) : ON • Play back the alignment tape CR2-1B PS. • Connect CH-1 of the oscilloscope to TP103 (Y RF)/VP-33 (D-1) and CH-2 to TP1 (Y SW)/VP-33 (D-1). • Observe waveform by magnifying time axis nearby both switching positions while changing the CH-2 trigger (+) and (−) alternately in the delay mode. • After adjustment, set S2-1, 2, 5 /DT-30 (B-1) to OFF.	CH-1 : TP103 (Y RF)/VP-33 (D-1) CH-2 : TP1 (Y SW)/VP-33 (D-1) oscilloscope (1) TRIG (+)  A≦20 μs (2) TRIG (−)  B≦20 μs (3) TRIG (+)/(−) (NOTE : This photo is dual taken by shifting vertical position.)  C≦5 μs	(confirm waveform) TRIG : CH-2 (+)/(−)

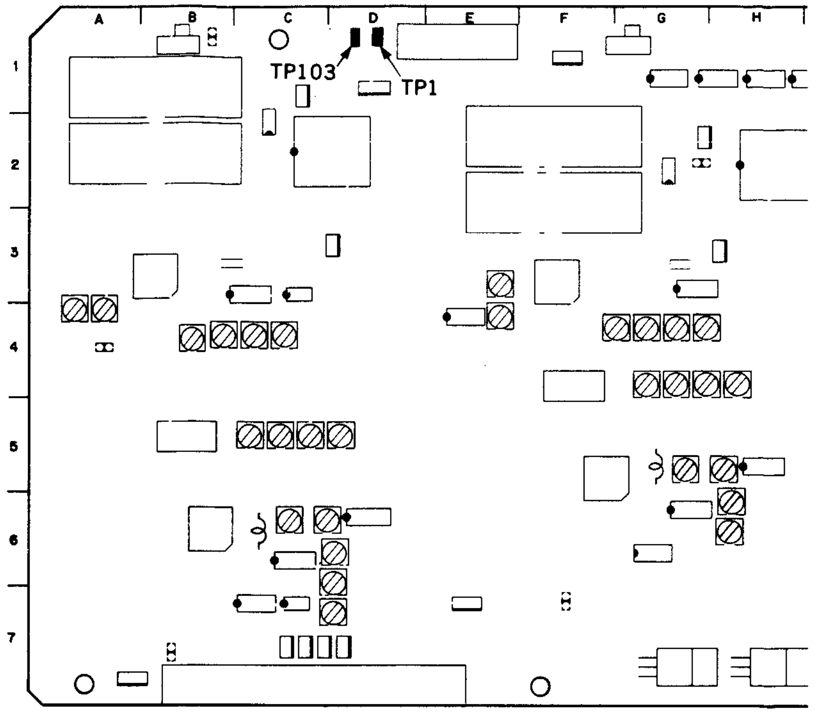
NOTE : If "ADJUST COMPLETE" is not displayed in step 1 or menu of "B110 : RF SWITCHING POS." in "B1 : SERVO ADJUST"mode, possible to manual adjust by mentioned below.

1. Set S601-1, 4/SS-48 (B-1) to ON when B110 menu is adjusted.
   Set S2-1, 2, 5/DT-30 (B-1) to ON when C12 menu is adjusted.
2. Move ∗ mark to "manual adjust".
3. Play back the alignment tape CR2-1B PS, and observe the waveform in the way of step 3.
4. Adjust to meet the specification described in step 3 by turn the search dial while pressing the SEARCH button.
5. After adjustment is completed, press EJECT button to remove the alignment tape and press S303/SS-48 (L-1) to return to the menu picture.
6. Save adjustment data.
   When B110 menu is adjusted, save the data by "B117 : NOV RAM CONTROL".
   When C12 menu is adjusted, save the data by "C15 : Save adjust data".
7. Press S303/SS-48 (L-1) three times to finish the maintenance mode, and set S601-1, 4/SS-48 (B-1) or S2-1, 2, 5/DT-30 (B-1) to OFF.

VP-33 board

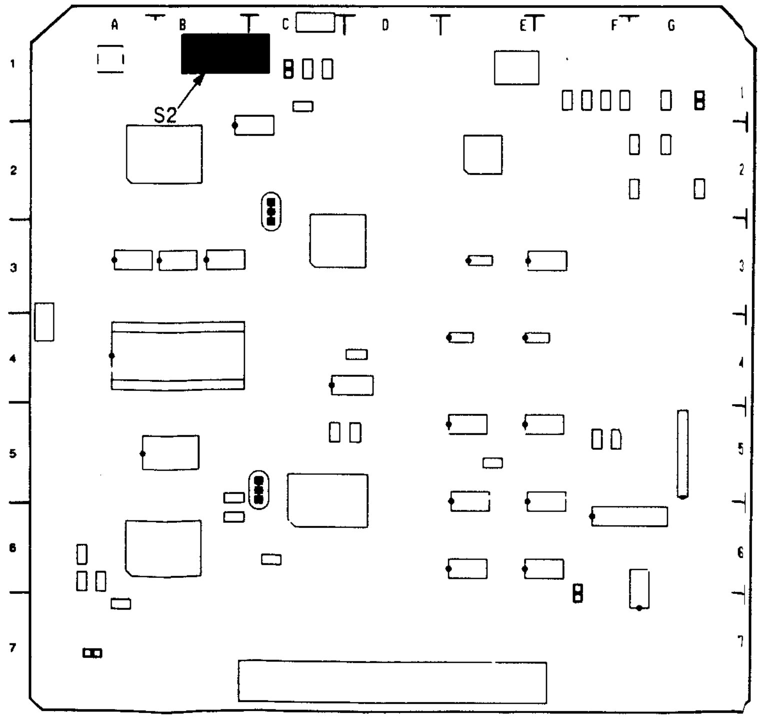


APPLICATION : 9-2-2. Step 3

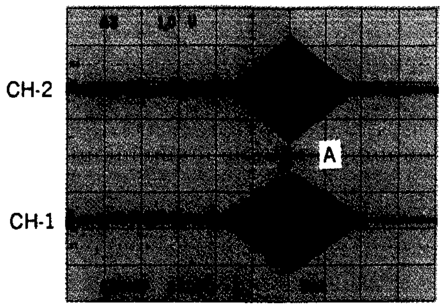
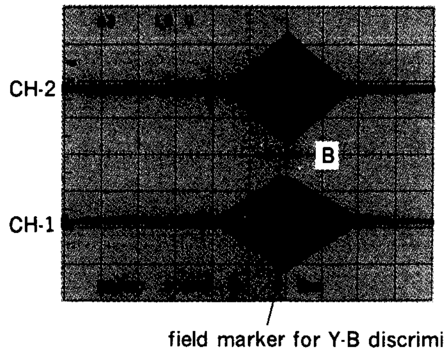


DT-30 board

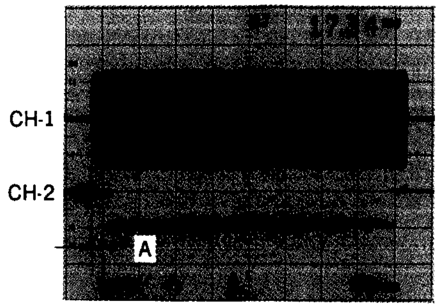
APPLICATION : 9-2-2. Step 3

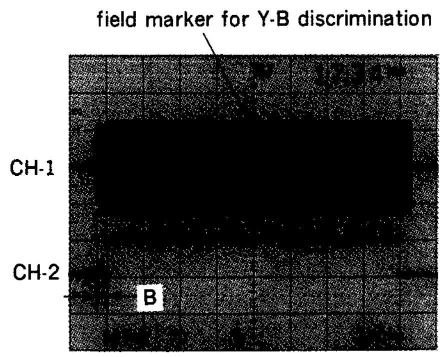
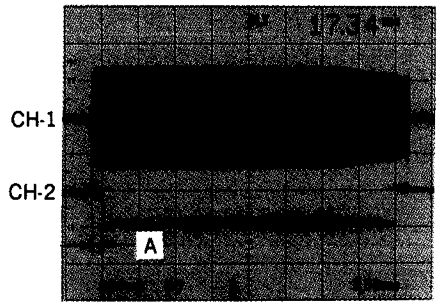
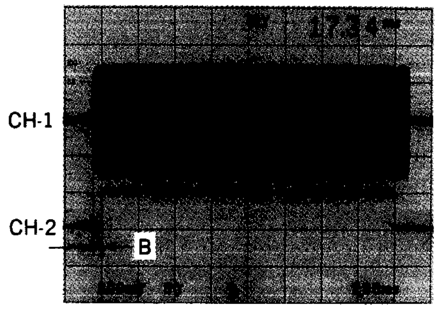


9-2-3. DT Pairing Check

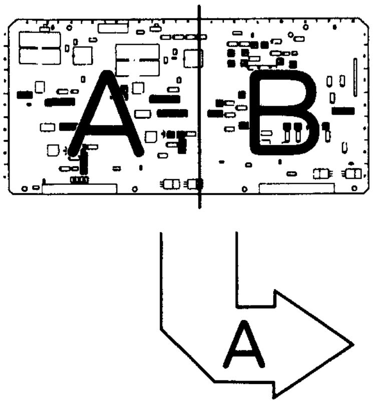
Preparations for adjustment	Specifications	Adjustments
• S2-1, 2, 5/DT-30 (B-1) : ON • Play back the alignment tape CR2-1B PS. • Set to the JOG mode, and set the peak of the waveform to center.	CH-1 : TP101 (YA)/VP-33 (D-1) CH-2 : TP401 (CA)/VP-33 (F-1) oscilloscope  A≦2 ms	(CH-A pairing check) TRIG: TP1 (Y SW) (+) /VP-33 (D-1)
• After adjustment, set S2-1, 2, 5 /DT-30 (B-1) to OFF.	CH-1 : TP102 (YB)/VP-33 (C-1) CH-2 : TP402 (CB)/VP-33 (F-1) oscilloscope  B≦2 ms	(CH-B pairing check) TRIG: TP1 (Y SW) (−) /VP-33 (D-1)

9-2-4. DT Overlap Check

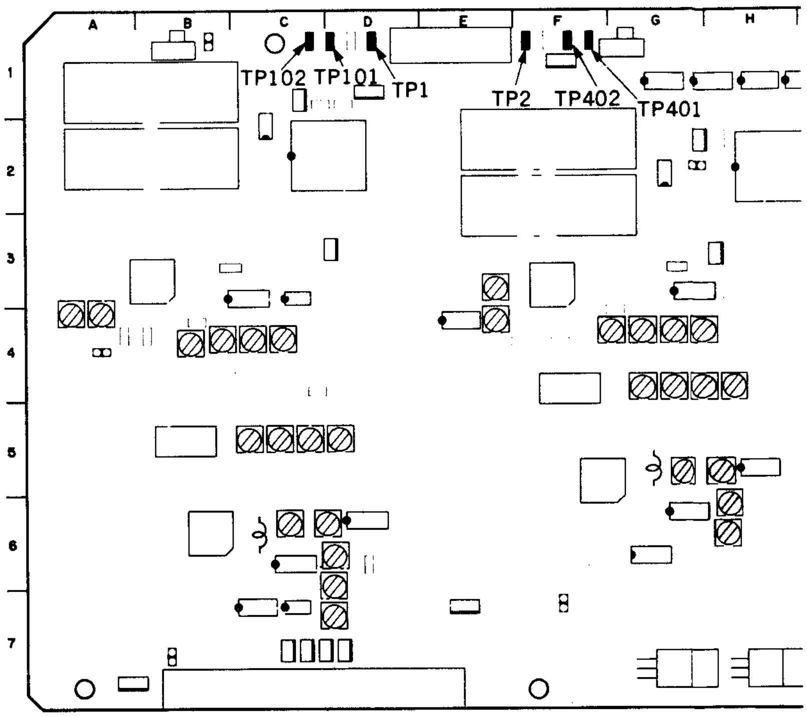
Preparations for adjustment	Specifications	Adjustments
• Play back the alignment tape CR2-1B PS.	CH-1 : TP101 (YA)/VP-33 (D-1) CH-2 : TP1 (Y SW)/VP-33 (D-1) oscilloscope  A≧400 μs	(Y-A overlap check) TRIG: CH-2 (+)

Preparations for adjustment	Specifications	Adjustments
	CH-1 : TP102 (YB)/VP-33 (C-1) CH-2 : TP1 (Y SW)/VP-33 (D-1) oscilloscope  B≧400 μs	(Y-B overlap check) TRIG: CH-2 (−)
	CH-1 : TP401 (CA)/VP-33 (F-1) CH-2 : TP2 (C SW)/VP-33 (F-1) oscilloscope  A≧280 μs	(C-A overlap check) TRIG: CH-2 (+)
	CH-1 : TP402 (CB)/VP-33 (F-1) CH-2 : TP2 (C SW)/VP-33 (F-1) oscilloscope  B≧280 μs	(C-B overlap check) TRIG: CH-2 (−)

VP-33 board



APPLICATION : 9-2-3.
9-2-4.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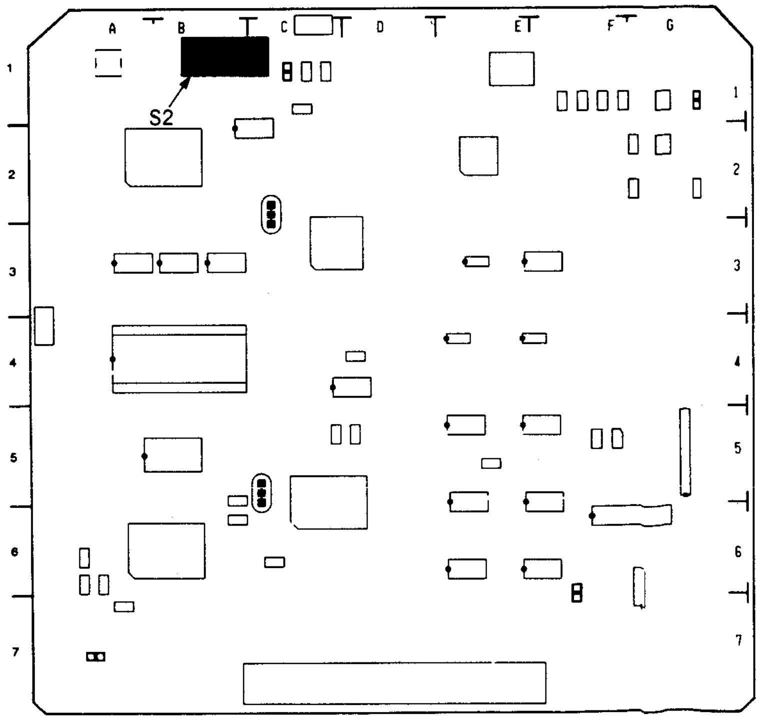
7
TP102
TP101
TP1
TP2
TP402
TP401

DT-30 board

APPLICATION : 9-2-3.
9-2-4.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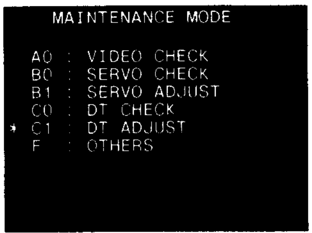
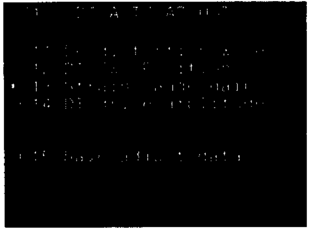
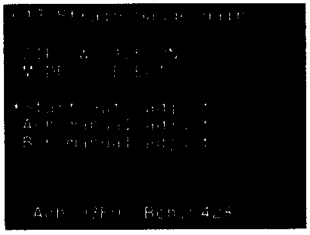
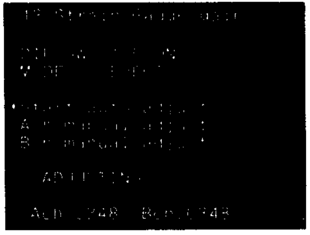
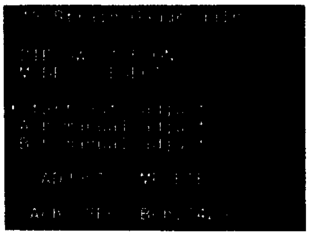
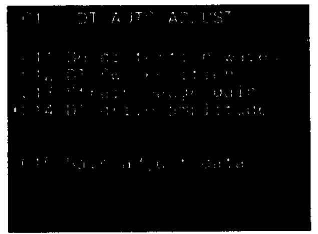
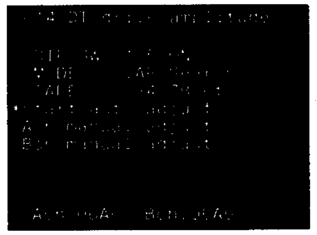
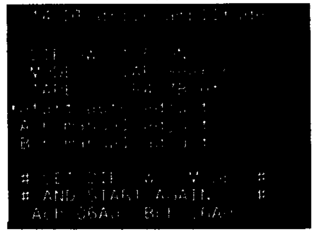
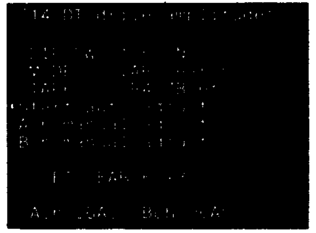
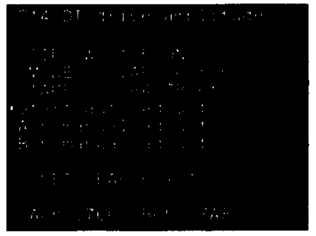
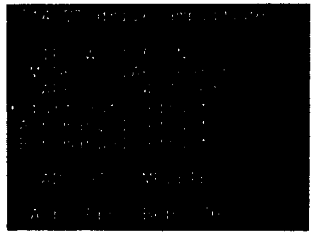
S2

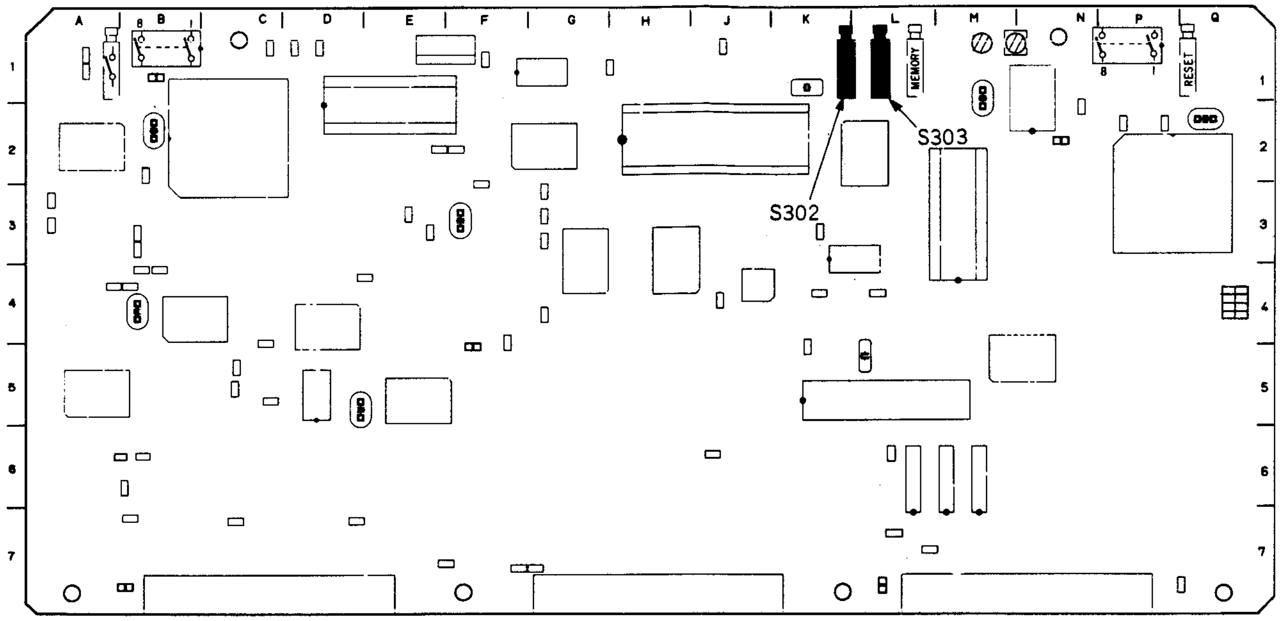
9-2-5. Strain Gauge/Loop Gain Adjustment

Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect a picture monitor to the VIDEO OUTPUT 3 connector or MONITOR connector. • CHARACTER switch (sub control panel): ON • S2-1, 5/DT-30 (B-1): ON • Turn on the power in EJECT completion state. (1) Press S302/SS-48 (K-1) to put the unit into the maintenance mode. (2) Press search dial to put the unit into the JOG mode, and move * mark to "C1 : DT ADJUST". (3) Press S302/SS-48. (4) Move * mark to "C13 : Strain Gauge gains". (5) Press S302/SS-48. (6) Move * mark to "Start auto adjust". (7) Press S302/SS-48 to execute the "auto adjust". (8) "ADJUSTING......" is displayed during execution, and value of the data that is displayed lower the picture monitor changes every moment. (9) "ADJUST COMPLETE" is displayed when adjustment is completed. (10) Press S303/SS-48 (L-1) to return to the menu picture.	MENU SELECTION picture monitor S2-1, 5/DT-30 (B-1): ON (1) ↓ press S302/SS-48 (K-1) (2)  MAINTENANCE MODE A0 : VIDEO CHECK B0 : SERVO CHECK B1 : SERVO ADJUST C0 : DT CHECK * C1 : DT ADJUST F : OTHERS select with search dial (3) ↓ press S302 (4)  select with search dial (5) ↓ press S302 (6)  (select with search dial) (7) ↓ press S302 (8)  ↓ (9)  (10) ↓ press S303/SS-48 (L-1)	(strain gauge adjustment)

Preparations for adjustment	Specifications	Adjustments
Step 2 (11) Move ＊ mark to "C14: DT drive amplitudes". (12) Press S302/SS-48 (K-1). (13) Move ＊ mark to "Start auto adjust". (14) Press S302/SS-48. (15) Insert the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS. Press VARIABLE button on the control panel. (16) Press S302/SS-48. (17) When "SET SEARCH x3" is displayed in the picture monitor, press search dial to put the unit into the SHUTTLE mode, and turn it clockwise fully. (NOTE: Click point of the clockwise is VAR+1, turn fully exceed the click point, otherwise it does not change to VAR+3.) (18) After picture monitor display changes into "SET SEARCH x−1", turn search dial counterclockwise fully. (NOTE: As for counterclockwise, it remains VAR−1 from click point to fully turned point.) (19) After "ADJUST COMPLETE" is displayed in the picture monitor, press the EJECT button to remove the alignment tape. (20) Press S303/SS-48 (L-1) to return to the menu picture.	(11)  select with search dial (12) press S302/SS-48 (K-1) (13)  (select with search dial) (14) press S302 (15)  insert CR5-1B (color bars signal), and press VARIABLE button (16) press S302 (17)  turn search dial (SHUTTLE) clockwise fully (VAR+3) (18)  turn search dial counterclockwise fully (VAR−1) (19)  press EJECT button to remove CR5-1B PS (20) press S303/SS-48 (L-1)	(loop gain adjustment)

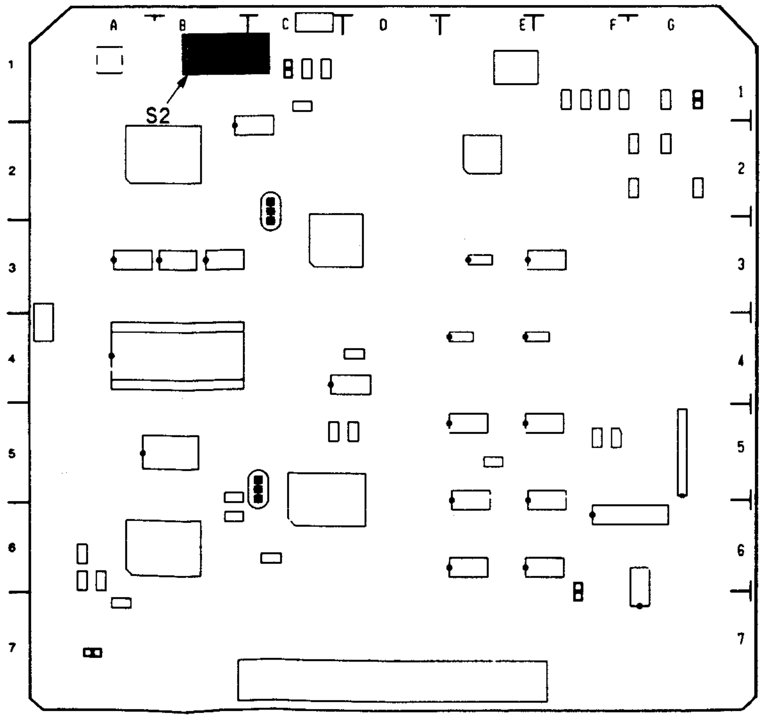
Continues to the next page.

SS-48 board APPLICATION: 9-2-5. Step 1
9-2-5. Step 2

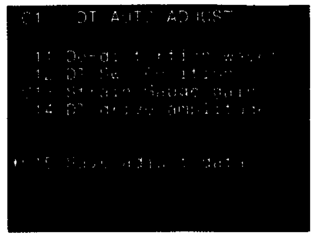
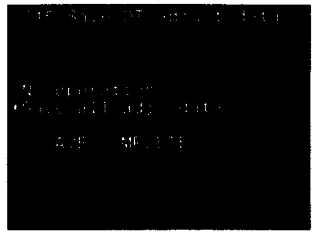
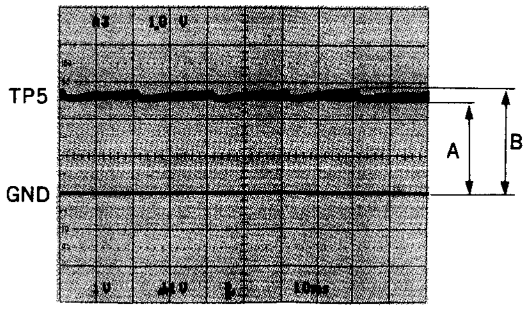


DT-30 board

APPLICATION: 9-2-5. Step 1
9-2-5. Step 2



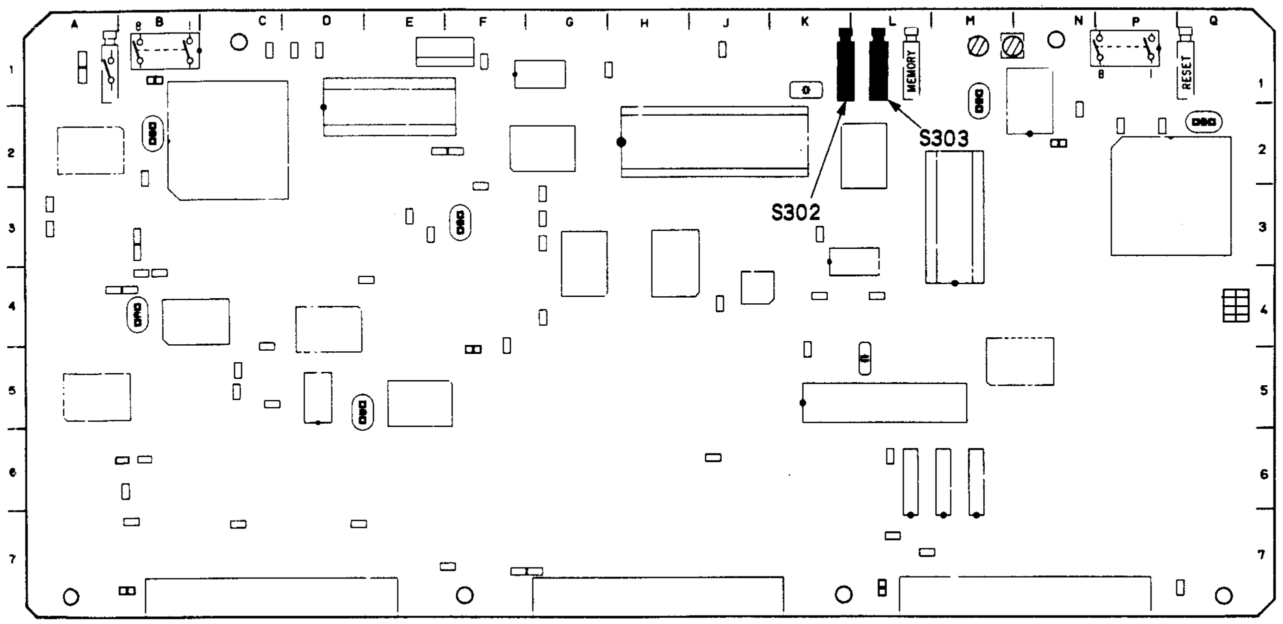
9-2-5. Strain Gauge/Loop Gain Adjustment (continued)

Preparations for adjustment	Specifications	Adjustments
Step 3 (21) Move * mark to "C15: Save adjust data". (22) Press S302/SS-48 (K-1). (23) Move * mark to "Save all adj. data". (24) Press S302/SS-48 to execute the "Save all adj.data". (25) "SAVE COMPLETE" is displayed when save is completed. (26) Press S303/SS-48 (L-1) three times to close the maintenance mode.	(21)  select with search dial (22) press S302/SS-48 (K-1) (23) select with search dial (24) press S302 (25)  (26) press S303/SS-48 (L-1) three times	(save adjustment data)
Step 4 • S2-1, 5/DT-30 (B-1): ON • VARIABLE playback mode • Play back the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS. • Turn the search dial slowly, confirm that specification is met in all of the limits (VAR+3 → STILL → VAR−1). • After adjustment, set S2-1, 5/DT-30 to OFF.	TP5 (YC DEL)/DT-30 (C-1) oscilloscope  A=2.5±0.5 V dc B=2.5±0.5 V dc	(confirm waveform) TRIG: TP105 (SYNC SW) /DT-30 (G-1)

NOTE: "Ach manual adjust" and "Bch manual adjust" in "C13: Strain Gauge gains" are factory use.
Possible to manual adjust about "C14: DT drive amplitudes" described in Step 2 by mentioned below.

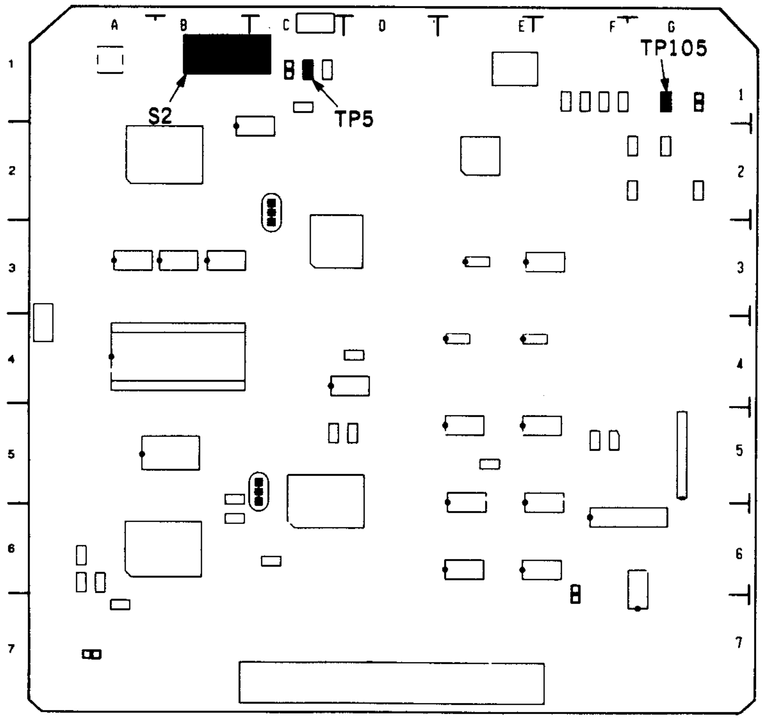
1. Move * mark to "Ach manual adjust" or "Bch manual adjust" at (13) in Step 2.
2. Play back the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS in the VARIABLE mode.
3. Adjust to meet the specification described in Step 4 by turn the search dial while pressing the SEARCH button.
4. After adjustments about both channels, press EJECT button to remove the alignment tape. Press S303/SS-48 (L-1) to return to the menu picture.
5. Save adjustment data by Step 3, and set S2-1, 5/DT-30 (B-1) to OFF.

SS-48 board APPLICATION: 9-2-5. Step 3
9-2-5. Step 4

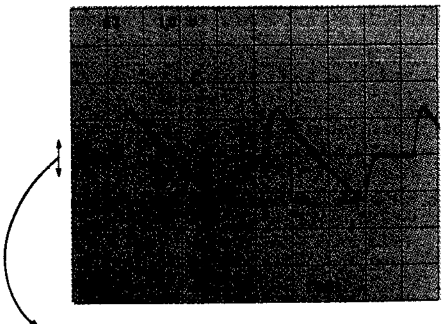


DT-30 board

APPLICATION: 9-2-5. Step 3
9-2-5. Step 4

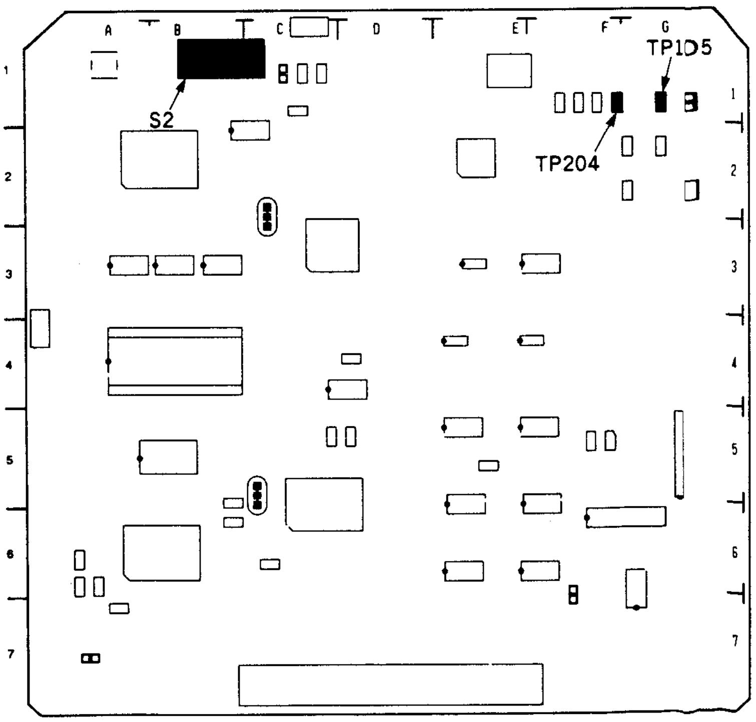


9-2-6. Wobbling Check

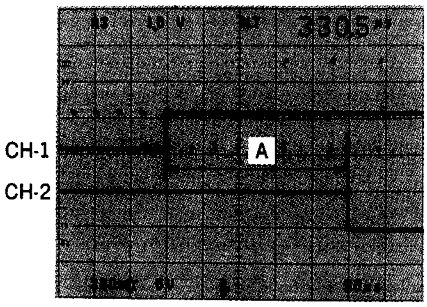
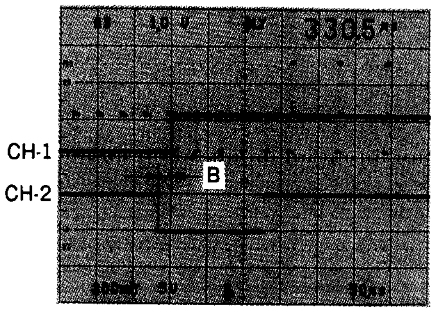
Preparations for adjustment	Specifications	Adjustments
• S2-1, 5/DT-30 (B-1): ON • VARIABLE playback mode • Play back the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS in still mode.	TP204 (DR A)/DT-30 (F-1) oscilloscope 	(wobbling check)
• After check, set S2-1, 5/DT-30 (B-1) to OFF.	check that when set S2-1/DT-30 (B-1) to OFF, waveform wobbles	TRIG: TP105 (SYNC SW) /DT-30 (G-1)

APPLICATION : 9-2-6.

DT-30 board

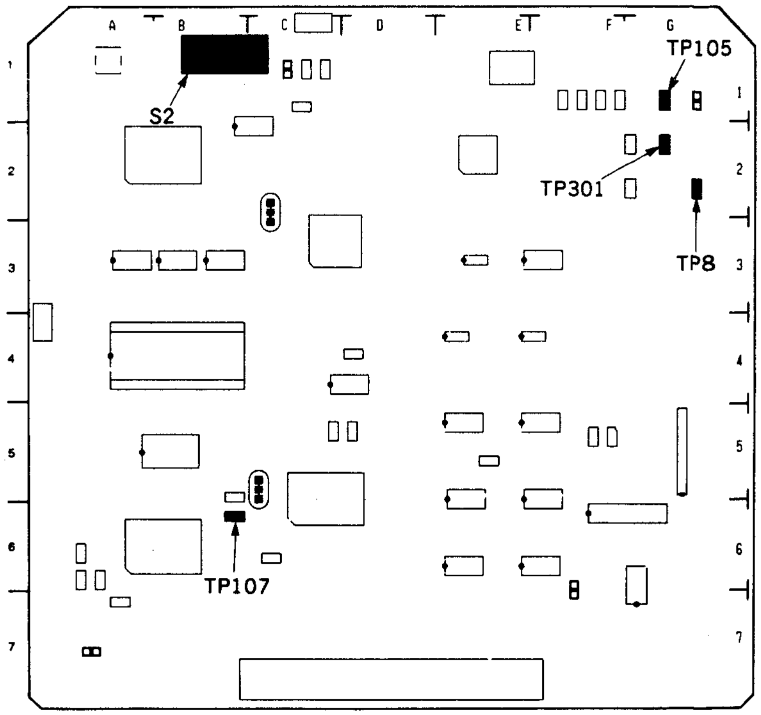


9-2-7. DT-V Check

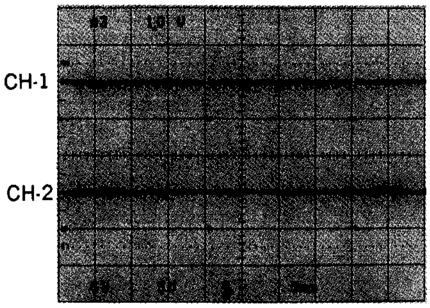
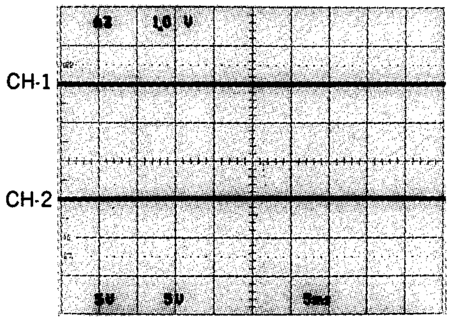
Preparations for adjustment	Specifications	Adjustments
• S2-1, 5/DT-30 (B-1): ON • Play back the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS. • After check, set S2-1, 5/DT-30 (B-1) to OFF.	CH-1: TP301 (DEMOD)/DT-30 (G-2) CH-2: TP8 (DT V)/DT-30 (G-2) oscilloscope  A=3.75±0.2 H	(A) (DT-V timing check) TRIG: TP105 (SYNC SW) /DT-30 (G-1)
	CH-1: TP301 (DEMOD)/DT-30 (G-2) CH-2: TP107 (VITC VD)/DT-30 (B-6) oscilloscope  (1) play mode B=−0.25±1 H (2) repeat VAR−1 and VAR+3 alternately B=−0.25±2 H (NOTE: Press the VARIABLE button, and turn the search dial (SHUTTLE mode) counterclockwise or clockwise fully to make to VAR−1 or VAR+3.)	(B) (VITC VD timing check) TRIG: TP105 (SYNC SW) /DT-30 (G-1)

APPLICATION : 9-2-7.

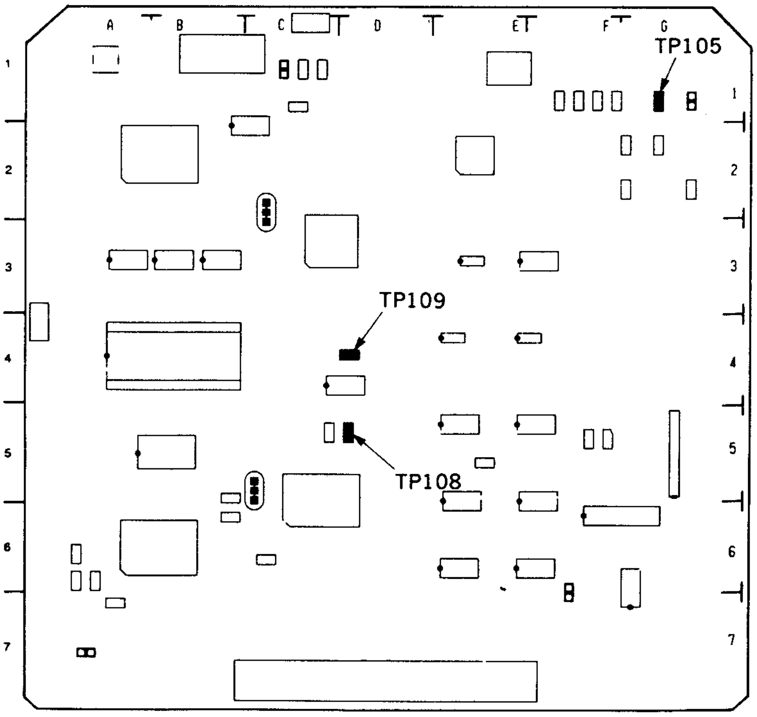
DT-30 board


A
B
C
D
E
F
G
1
2
3
4
5
6
7
S2
TP105
TP301
TP8
TP107

9-2-8. PCM Mute Pulse Check

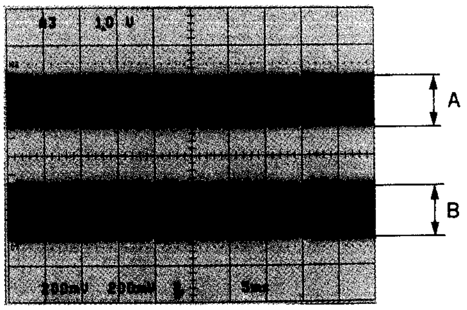
Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14 : 00—17 : 00) of the alignment tape CR5-1B PS.	CH-1 : TP108 (Y PM)/DT-30 (D-5) CH-2 : TP109 (C PM)/DT-30 (D-4) oscilloscope (1) in still mode, there are pulses  (2) in playback mode, there is no pulse 	(PCM Mute pulse check) TRIG: TP105 (SYNC SW) /DT-30 (G-1)

DT-30 board

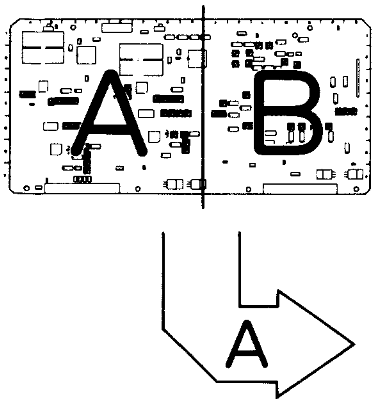


APPLICATION : 9-2-8.

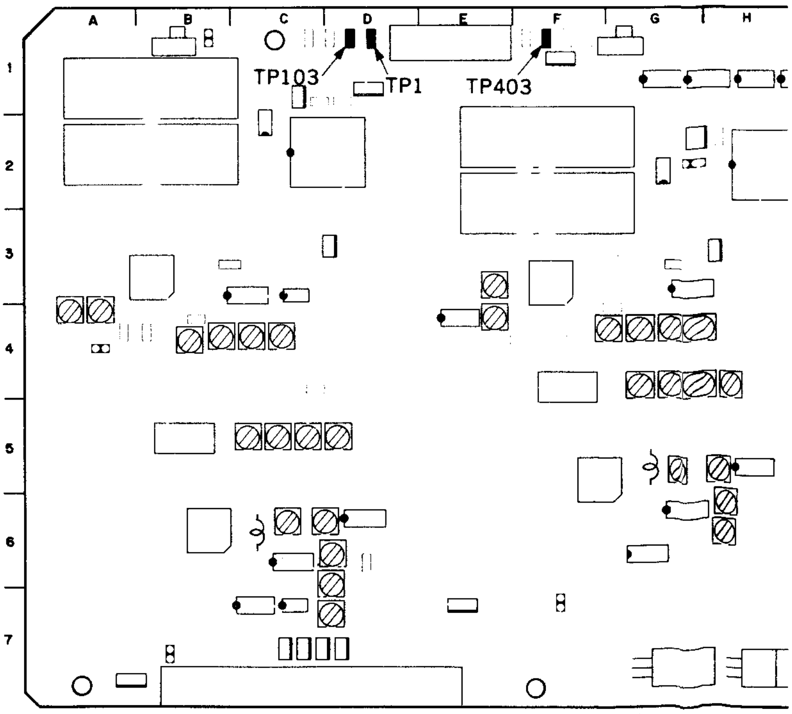
9-2-9. DT RF Fluctuation Check

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14: 00—17: 00) of the alignment tape CR5-1B PS.	CH-1 : TP103 (Y RF)/VP-33 (D-1) CH-2 : TP403 (C RF)/VP-33 (F-1) oscilloscope  (1) When PLAY to VAR−1 to VAR+3 is repeated three times, the level of A and B are never less than 50% level of the playback mode. And there is no jitter in the vertical direction, and monitor picture is normal. (2) In the JOG mode, when turn the search dial clockwise and counterclockwise alternately for three times within nearly 90 degrees, the level of A and B are never less than 50% level of the playback mode. And there is no jitter in the vertical direction, and picture is normal. (NOTE : Press the VARIABLE button, and turn the search dial (SHUTTLE mode) counterclockwise or clockwise fully to make to VAR−1 or VAR+3.)	(RF fluctuation check) TRIG : TP1 (Y SW) /VP-33 (D-1)

VP-33 board



APPLICATION : 9-2-9.



SECTION 10
AUDIO/TIME CODE SYSTEM ALIGNMENT

[Equipment Required]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Audio Level Meter
- Picture Monitor
- Alignment Tape CR8-1A PS (Part No. 8-960-098-45)

Contents

TIME min s	AUDIO TRACK
0: 00	1 kHz, 0 VU[*1]
2: 55	Blank
3: 00	10 kHz, −10 VU
4: 55	Blank
5: 00	1 kHz, −20 VU
5: 55	Blank
6: 00	40 Hz, 7, 10, 15 kHz, −20 VU[*2]
7: 55	Blank
8: 00	1 kHz, 0 VU CTL TRACK 1 kHz, 0 VU
10: 00	

∗ 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

Example: Correction value = −0.5 dB
Output level = 0 dB − 0.5 dB = −0.5 dB

∗ 2. When this tape is reproduced in the audio frequency response check or adjustment, the output level should be corrected according to the correction value.

- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

  Contents

TIME min s	AUDIO TRACK	VIDEO TRACK	CTL TRACK
0: 00	1 kHz, 0 VU*1	Black Burst	CTL
3: 00	15 kHz, 0 VU	Black Burst	CTL
5: 00	1 kHz, −20 VU	Black Burst	CTL
6: 00	40 Hz, −20 VU*2	Black Burst	CTL
6: 30	7 kHz, −20 VU*2		
7: 00	10 kHz, −20 VU*2		
7: 30	15 kHz, −20 VU*2		
8: 00 10: 00	1 kHz 0 VU	—	1 kHz sine wave

* 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

Example: Correction value=−0.5 dB

Output level=0 dB−0.5 dB=−0.5 dB

* 2. When this tape is reproduced in the audio frequency response check or adjustment, the output level should be corrected according to the correction value.

[Switch/Setup menu/Volume Setting]

This setting should not be changed in position unless otherwise specified.

Terminate the output of the AUDIO OUT connector at 600 Ω unless otherwise specified.

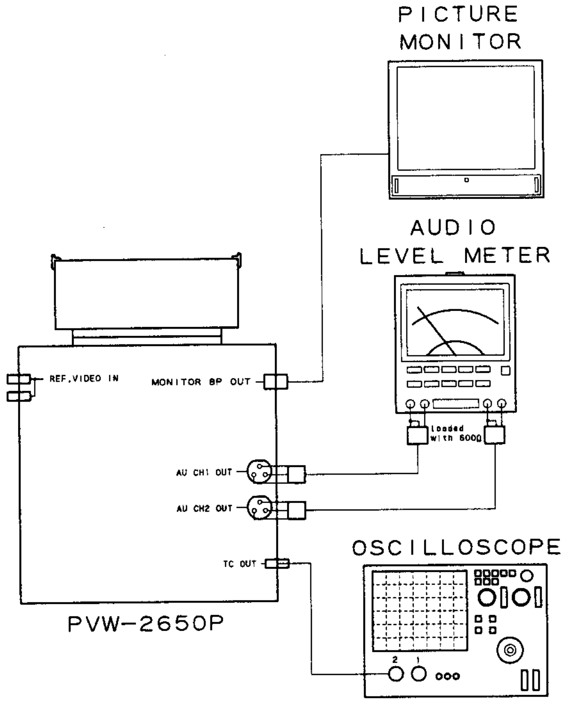
<Control Panel>
upper
AUDIO MONITOR: MIX
CH1 PB VOL: PUSH(PRESET)
CH2 PB VOL: PUSH(PRESET)
HEADPHONES VOL: MIN

<Sub Control Panel>
DOLBY NR: OFF

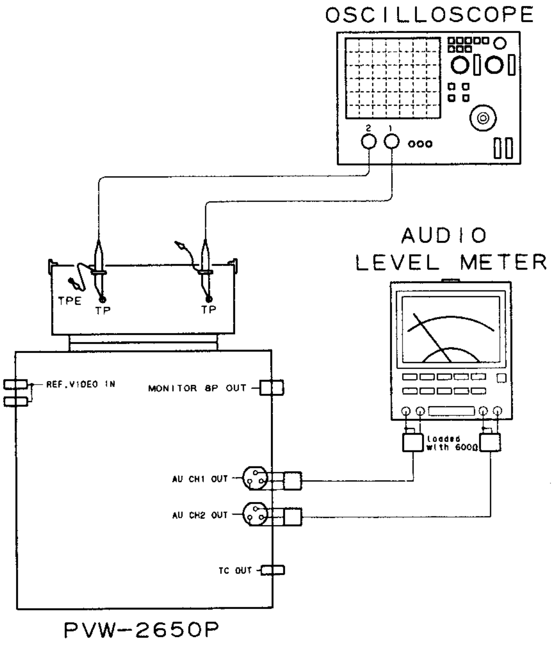
[Connection]

Connect some equipments as following CONNECTION 1 or CONNECTION 2 unless otherwise specified.
Terminate the output of the AUDIO OUT connector at 600 Ω unless otherwise specified.

CONNECTION 1.


PICTURE MONITOR
AUDIO LEVEL METER
Loaded with 600Ω
REF.VIDEO IN
MONITOR 8P OUT
AU CH1 OUT
AU CH2 OUT
TC OUT
OSCILLOSCOPE
2
1
PVW-2650P

CONNECTION 2.


OSCILLOSCOPE
2
1
AUDIO LEVEL METER
TPE
TP
TP
Loaded with 600Ω
REF.VIDEO IN
MONITOR 8P OUT
AU CH1 OUT
AU CH2 OUT
TC OUT
PVW-2650P

[Preparations and Notes on Alignment]

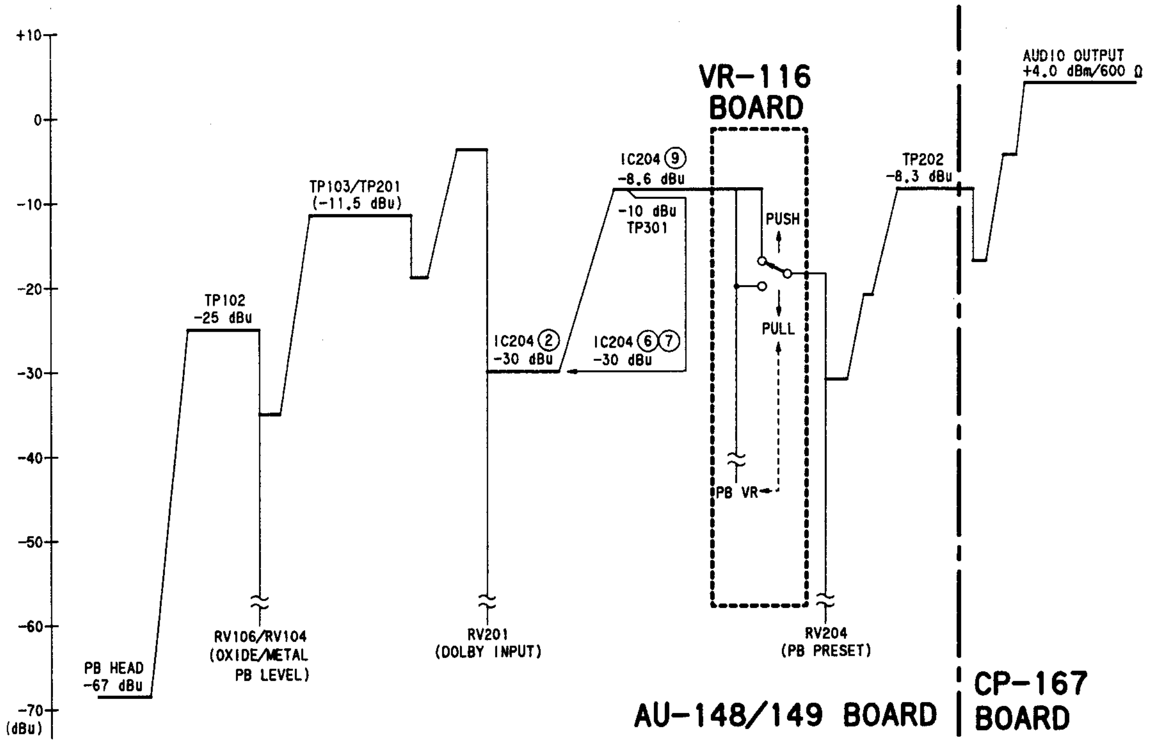
- **Preparations**

Cleaning of stationary heads

Clean two stationary heads by the cleaning piece moistened with cleaning fluid. After the fluid blow off, wipe off the heads by a dry cloth or cleaning piece.

- **Notes for alignment**
  - Level fluctuation at 15 kHz in PB is permitted by 0.5 dB.
  - When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape lavel.
  - The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

AUDIO SYSTEM LEVEL DIAGRAM
PB MODE(CR8-1A, 1 kHz 0 VU PORTION)


+10
0
-10
-20
-30
-40
-50
-60
-70
(dBu)
PB HEAD
-67 dBu
TP102
-25 dBu
RV106/RV104
(OXIDE/METAL
PB LEVEL)
TP103/TP201
(-11.5 dBu)
RV201
(DOLBY INPUT)
IC204 ②
-30 dBu
IC204 ⑥⑦
-30 dBu
IC204 ⑨
-8.6 dBu
-10 dBu
TP301
VR-116
BOARD
PUSH
PULL
PB VR
RV204
(PB PRESET)
TP202
-8.3 dBu
AUDIO OUTPUT
+4.0 dBm/600 Ω
AU-148/149 BOARD
CP-167
BOARD

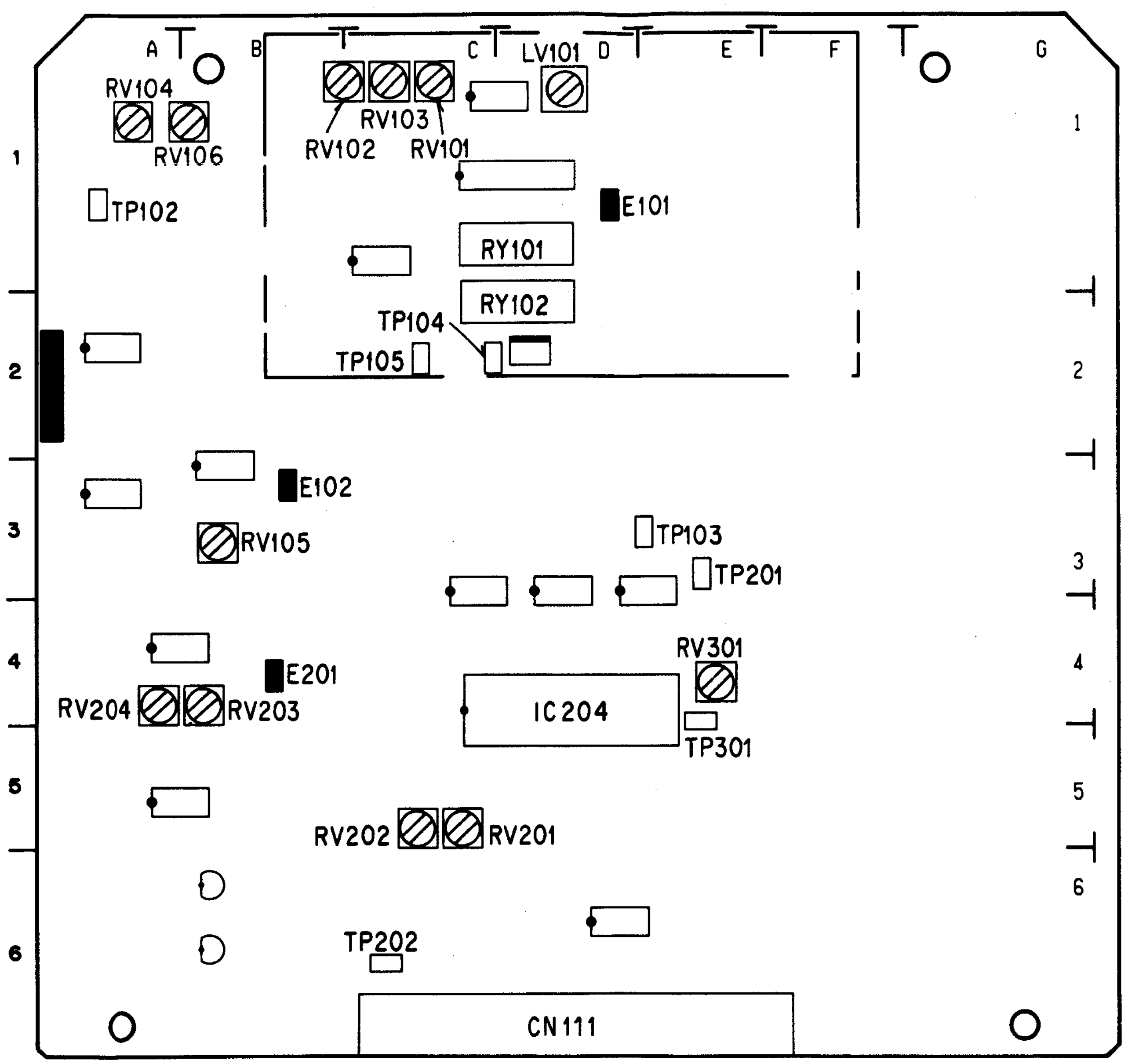
(REFERENCE)
0 dBu=0.775 V rms

(EXAMPLE)

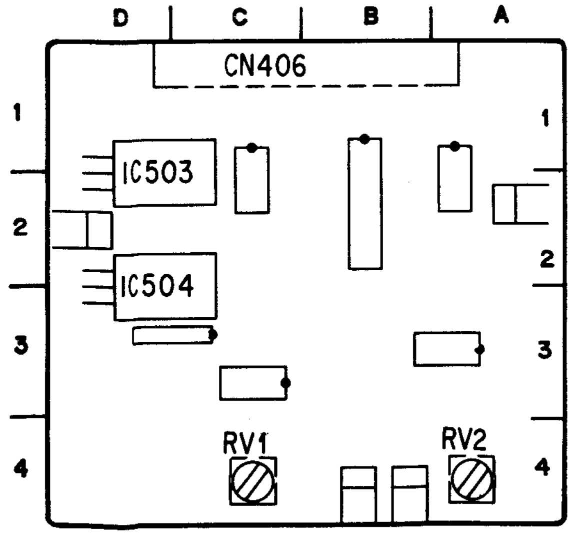
dBu	mV rms	mVp-p at sine wave
-67	0.35	1.0
-25	43.6	123
-11.5	206	583
-30	24.5	69.3
-10	245	693
-8.6	288	814
-8.3	298	843
+4.0 dBm	1228	3474.0

✱ dBm --- 600 Ω TERMINATED

AU-148/149 board (A Side)


A
B
C
LV101
D
E
F
G
RV104
RV106
RV103
RV102
RV101
1
TP102
E101
RY101
RY102
TP104
TP105
2
E102
3
TP103
TP201
RV105
4
RV301
IC204
TP301
E201
RV204
RV203
5
RV202
RV201
6
TP202
CN111

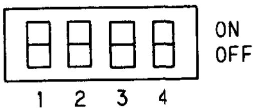
MA-44 board (A Side)


D
C
B
A
CN406
1
IC503
2
IC504
3
RV1
RV2
4

10-1. AUDIO PB DOLBY OFF FREQUENCY RESPONSE ADJUSTMENT

10-1-1. CH-1 Audio PB Dolby Off Frequency Response Adjustment

<table>
<tr><th>Preparations for adjustment</th><th>Specifications</th><th>Adjustments</th></tr>
<tr>
<td>Step 1

• Set RV201/AU-148 (C-5) in the direction of 3 o'clock.
• Play back the 1 kHz, 40 Hz, 7 kHz, 10 kHz and 15 kHz (−20 VU) signal portion (5: 00—7: 55) of the alignment tape CR8-1A PS.</td>
<td>CH1 AUDIO OUT
<table>
<tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr>
<tr><td>40</td><td>$0^{+0.7}_{-2.5}$</td></tr>
<tr><td>1 k</td><td>0(REF)</td></tr>
<tr><td>7 k</td><td>0±0.5</td></tr>
<tr><td>10 k</td><td>$0^{+0.5}_{-0.7}$</td></tr>
<tr><td>15 k</td><td>$0.7^{+1.0}_{-0.5}$</td></tr>
</table>
</td>
<td>High-Frequency
⊘RV101/AU-148 (C-1)
Middle-Frequency
⊘RV102/AU-148 (C-1)
Adjust alternately
If the specification of the high frequency is not satisfied, change SW101/AU-148 (C-1) board.

Set SW101/AU-148 and SW101/AU-149 at the same position and then perform the adjustment.

CONNECTION 2</td>
</tr>
<tr>
<td>Step 2
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.</td>
<td>TP301/AU-148 (E-4)
−10.00±0.05 dBu</td>
<td>⊘RV106/AU-148 (B-1)

CONNECTION 2</td>
</tr>
<tr>
<td>Step 3
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.</td>
<td>CH1 AUDIO OUT
+4.0±0.1 dBm</td>
<td>⊘RV204/AU-148 (A-4)

CONNECTION 2</td>
</tr>
</table>

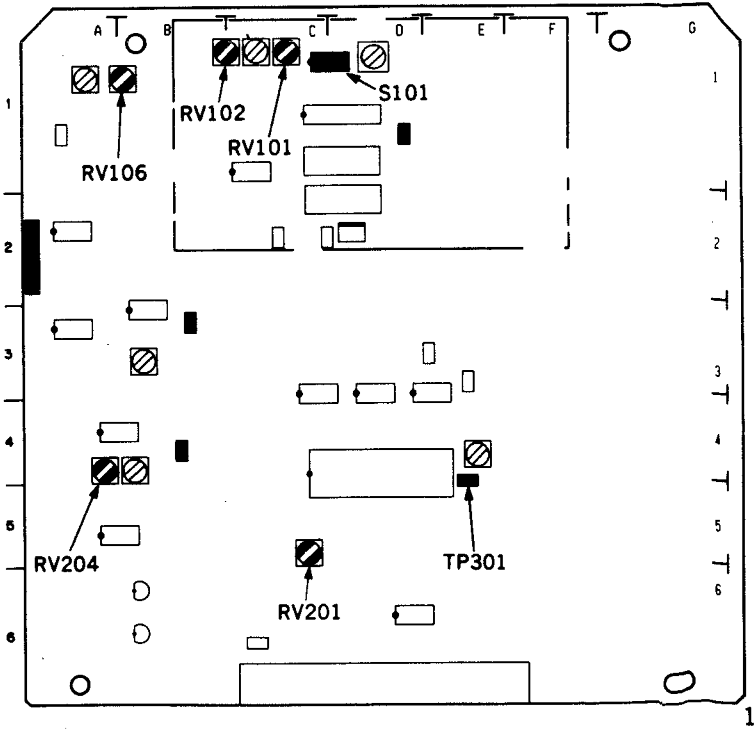
NOTE: If SW101/AU-148 was changed, perform Section 10-1-4. CH-1 Audio PB Phase Adjustment.

cf. When the level of TP301 is measured by oscilloscope, use formula given below.

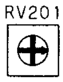
−10.00±0.05 dBu=693±4 mV p-p

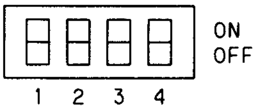
APPLICATION : 10-1-1.

AU-148/149 board



10-1-2. CH-2 Audio PB Dolby Off Frequency Response Adjustment

<table>
<tr><th>Preparations for adjustment</th><th>Specifications</th><th>Adjustments</th></tr>
<tr>
<td>Step 1


• Set RV201/AU-149 (C-5) in the direction of 3 o'clock.
• Play back the 1 kHz, 40 Hz, 7 kHz, 10 kHz and 15 kHz (−20 VU) signal portion (5: 00—7: 55) of the alignment tape CR8-1A PS.</td>
<td>CH2 AUDIO OUT
<table>
<tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr>
<tr><td>40</td><td>$0^{+0.7}_{-2.5}$</td></tr>
<tr><td>1 k</td><td>0(REF)</td></tr>
<tr><td>7 k</td><td>0±0.5</td></tr>
<tr><td>10 k</td><td>$0^{+0.5}_{-0.7}$</td></tr>
<tr><td>15 k</td><td>$-0.7^{+1.0}_{-0.5}$</td></tr>
</table>
</td>
<td>High-Frequency
⊘RV101/AU-149 (C-1)
Middle-Frequency
⊘RV102/AU-149 (C-1)
Adjust alternately
If the specification of the high frequency is not satisfied, change SW101/AU-149 (C-1) board.


Set SW101/AU-148 and SW101/AU-149 at the same position and then perform the adjustment.
CONNECTION 2</td>
</tr>
<tr>
<td>Step 2
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.</td>
<td>TP301/AU-149 (E-4)
−10.00±0.05 dBu</td>
<td>⊘RV106/AU-149 (B-1)
CONNECTION 2</td>
</tr>
<tr>
<td>Step 3
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.</td>
<td>CH2 AUDIO OUT
+4.0±0.1 dBm</td>
<td>⊘RV204/AU-149 (A-4)
CONNECTION 2</td>
</tr>
</table>

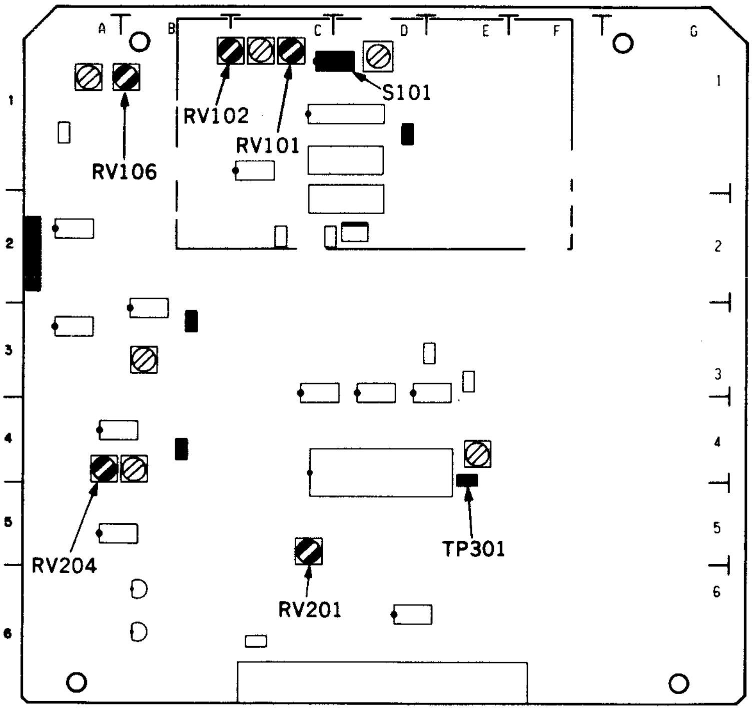
NOTE: If SW101/AU-149 was changed, perform Section 10-1-6. CH-2 Audio PB Phase Adjustment.

cf. When the level of TP301 is measured by oscilloscope, use formula given below.

−10.00±0.05 dBu=693±4 mV p-p

APPLICATION : 10-1-2.

AU-148/149 board

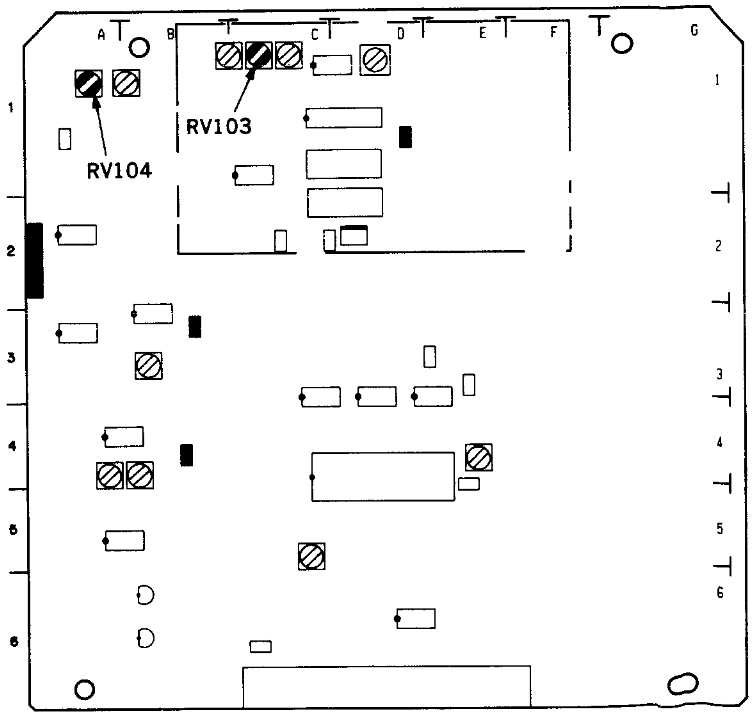


10-1-3. CH-1 Audio PB Dolby Off Metal Frequency Response Adjustment

<table>
<tr><th>Preparations for adjustment</th><th>Specifications</th><th>Adjustments</th></tr>
<tr><td>Step 1
• Play back the 1 kHz, 40 Hz, 7 kHz, 10 kHz and 15 kHz (−20 VU) signal portion (5 : 00—8 : 00) of the alignment tape CR8-1B PS.</td><td>CH1 AUDIO OUT
<table>
<tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr>
<tr><td>1 k</td><td>0 (REF)</td></tr>
<tr><td>10 k</td><td>0 ±0.5</td></tr>
<tr><td>15 k</td><td>$0^{+0.5}_{-0.7}$</td></tr>
</table></td><td>High-Frequency
⊘RV103/AU-148 (C-1)
CONNECTION 2</td></tr>
<tr><td>Step 2
• Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 30) of the alignment tape CR8-1B PS.</td><td>CH1 AUDIO OUT
+4.0±0.1 dBm</td><td>⊘RV104/AU-148 (A-1)
CONNECTION 2</td></tr>
</table>

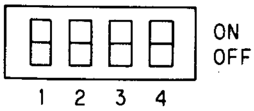
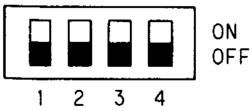
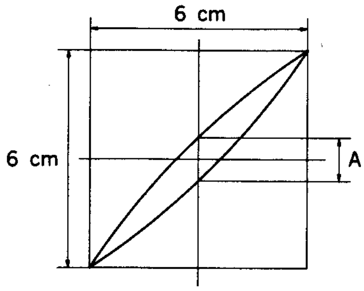
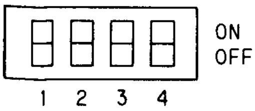
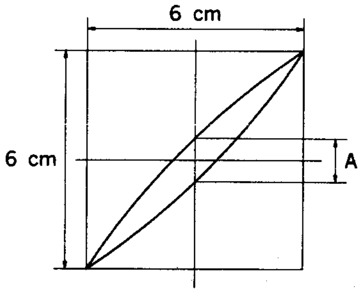
APPLICATION : 10-1-3.

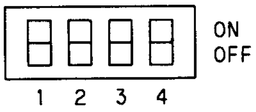
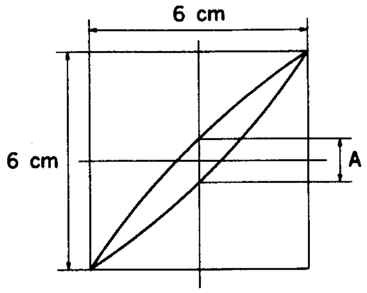
AU-148/149 board



10-1-4. CH-1 Audio PB Phase Adjustment

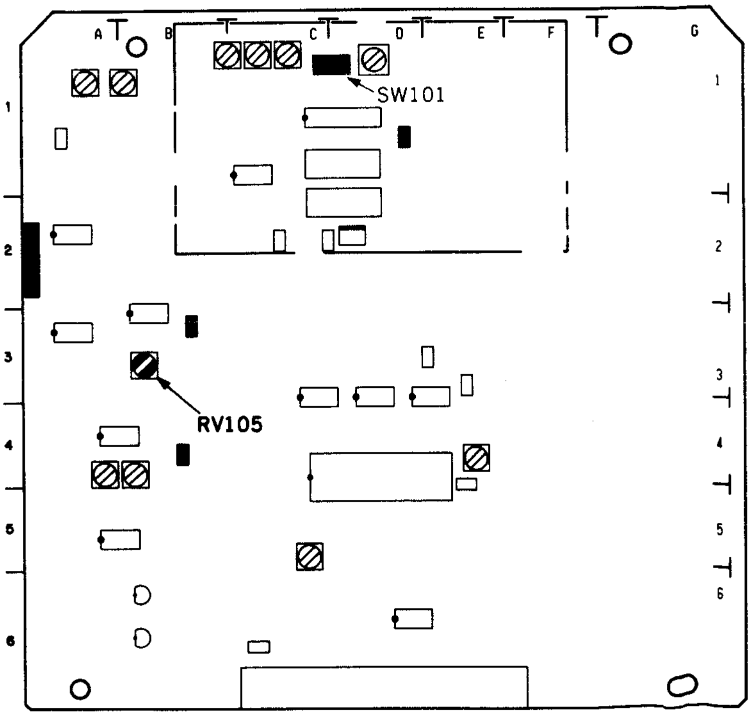
Before the adjustment, Audio Head Phase Adjustment in Section 6-8 should be completed.

Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect the CH1 probe of the oscilloscope to CH2 AUDIO OUT connector. (HOT side to 2 pin, and GND side to 3 pin) • Connect the CH2 probe of the oscilloscope to CH1 AUDIO OUT connector. (HOT side to 2 pin, and GND side to 3 pin) • Set the oscilloscope to X-Y mode. • Write down the setting of SW101 bit1 through bit4 (C-1) on the AU-148 and AU-149 boards.  • Set SW101 on the AU-148 board and SW101 on the AU-149 board to all OFF.  • Play back the 10 kHz, −10 VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	CH1 AUDIO OUT (CH2 probe: Y axis) CH2 AUDIO OUT (CH1 probe: X axis)  The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less) If the specification is not satisfied, perform Audio Head Phase Adjustment in Section 6-8.	(Check) CONNECTION 2
Step 2 • Extend the AU-148 board by extention board. • Reset SW101 on the AU-148 board to the memorized position in Step 1.  • Play back the 10 kHz, −10 VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	 The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less)	⊘RV105/AU-148 (B-3) CONNECTION 2

Preparations for adjustment	Specifications	Adjustments
Step 3 • Disconnect the extention board. • Set SW101/AU-149 (C-1) to memorized position in Step 1.  • Play back the 10kHz, −10VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	 The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less) If the specification is not satisfied, perform CH-2 Audio PB Phase Adjustment in section 10-1-6.	(Check) CONNECTION 2

APPLICATION: 10-1-4.

AU-148/149 board

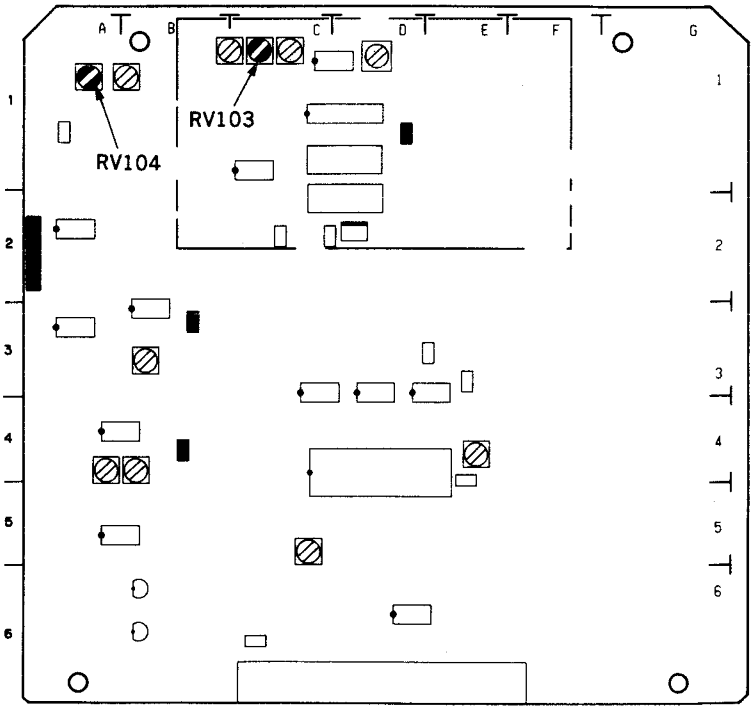


10-1-5. CH-2 Audio PB Dolby Off Metal Frequency Response Adjustment

<table>
<tr><th>Preparations for adjustment</th><th>Specifications</th><th>Adjustments</th></tr>
<tr><td>Step 1
• Play back the 1 kHz, 40 Hz, 7 kHz, 10 kHz and 15 kHz (−20 VU) signal portion (6: 00—8: 00) of the alignment tape CR8-1B PS.</td><td>CH2 AUDIO OUT
<table><tr><th>FREQUENCY [Hz]</th><th>OUTPUT LEVEL [dB]</th></tr><tr><td>1 k</td><td>0 (REF)</td></tr><tr><td>10 k</td><td>0 ±0.5</td></tr><tr><td>15 k</td><td>$0\,^{+0.5}_{-0.7}$</td></tr></table></td><td>High-Frequency
⊘RV103/AU-149 (C-1)
CONNECTION 2</td></tr>
<tr><td>Step 2
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 30) of the alignment tape CR8-1B PS.</td><td>CH2 AUDIO OUT
+4.0±0.1 dBm</td><td>⊘RV104/AU-149 (A-1)
CONNECTION 2</td></tr>
</table>

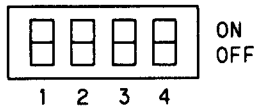
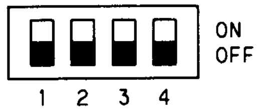
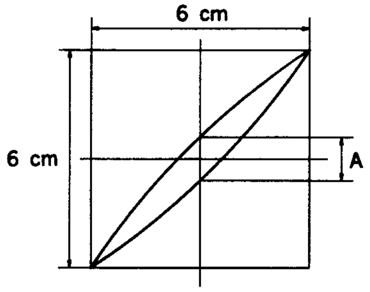
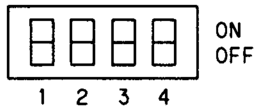
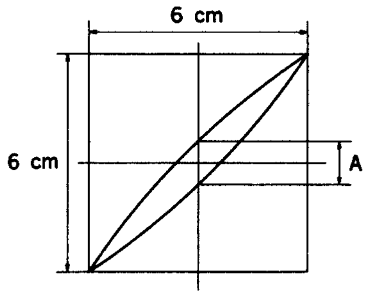
APPLICATION: 10-1-5.

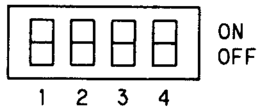
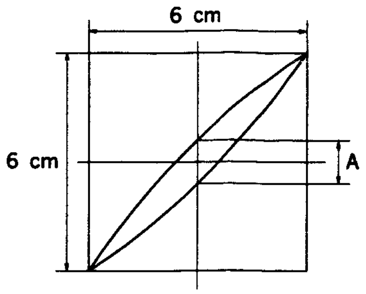
AU-148/149 board



10-1-6. CH-2 Audio PB Phase Adjustment

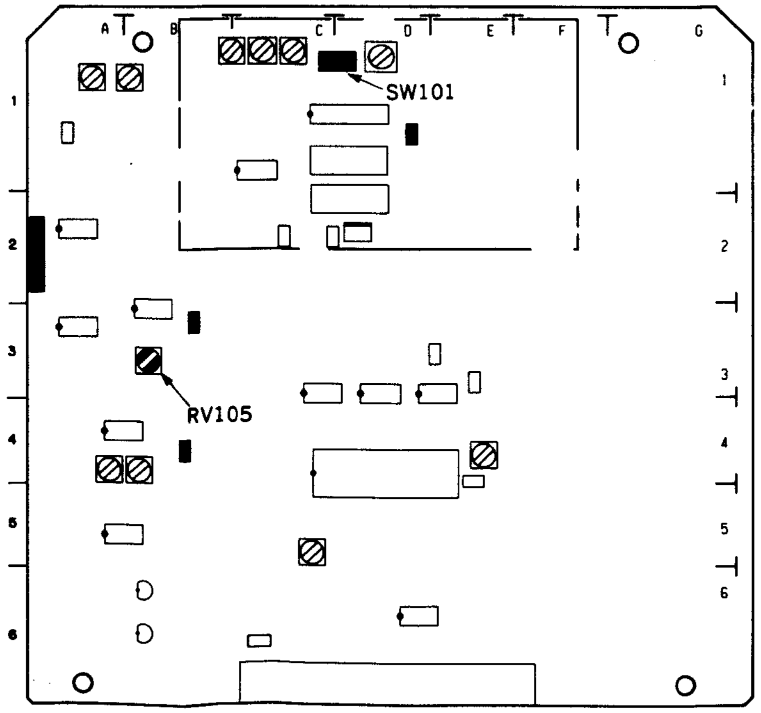
Before the adjustment, Audio Head Phase Adjustment in Section 6-8 should be completed.

Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect the CH1 probe of the oscilloscope to CH1 AUDIO OUT connector. (HOT side to 2 pin, and GND side to 3 pin) • Connect the CH2 probe of the oscilloscope to CH2 AUDIO OUT connector. (HOT side to 2 pin, and GND side to 3 pin) • Set the oscilloscope to X-Y mode. • Write down the setting of SW101 bit1 through bit4 (C-1) on the AU-148 and AU-149 boards.  • Set SW101 on the AU-148 board and SW101 on the AU-149 board to all OFF.  • Play back the 10 kHz, −10 VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	CH1 AUDIO OUT (CH1 probe: X axis) CH2 AUDIO OUT (CH2 probe: Y axis)  The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less) If the specification is not satisfied, perform Audio Head Phase Adjustment in Section 6-8.	(Check) CONNECTION 2
Step 2 • Extend the AU-149 board by extention board. • Reset SW101 on the AU-149 board to the memorized position in Step 1.  • Play back the 10 kHz, −10 VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	 The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less)	⊘RV105/AU-149 (B-3) CONNECTION 2

Preparations for adjustment	Specifications	Adjustments
Step 3 • Disconnect the extention board. • Set SW101/AU-148 (C-1) to memorized position in Step 2  • Play back the 10 kHz, −10 VU signal portion (3: 00—4: 55) of the alignment tape CR8-1A PS.	 The lissajous waveform should point from the bottom-left to the top-right corner area. A≦0.5 cm (±5° or less) If the specification is not satisfied, perform CH-1 Audio PB Phase Adjustment in section 10-1-4.	(Check) CONNECTION 2

APPLICATION : 10-1-6.

AU-148/149 board



10-2. SEARCH MODE AUDIO PB LEVEL CHECK

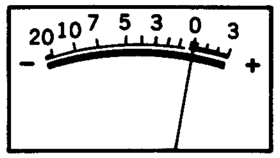
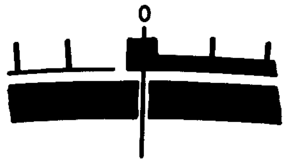
10-2-1. CH-1 Search Mode Audio PB Level Check

Preparations for adjustment	Specifications	Adjustments
• Rev search (10 times normal speed) the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.	CH1 AUDIO OUT +10.0 dBm or less	(Check) CONNECTION 2

10-2-2. CH-2 Search Mode Audio PB Level Check

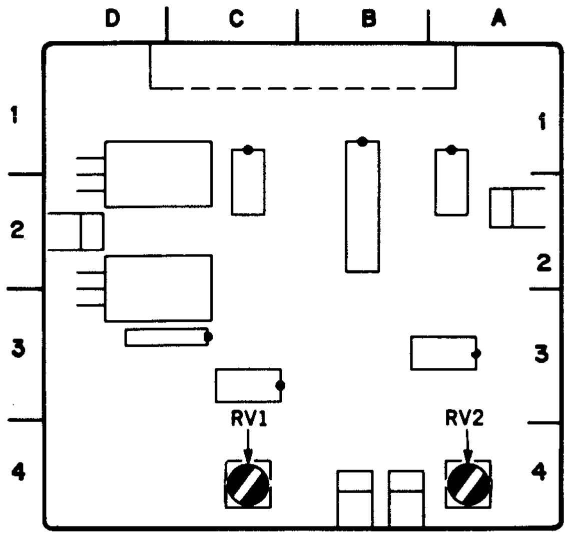
Preparations for adjustment	Specifications	Adjustments
• Rev search (10 times normal speed) the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.	CH2 AUDIO OUT +10.0 dBm or less	(Check) CONNECTION 2

10-3. AUDIO METER ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
• Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1A PS.	CH1/CH2 VU METER   The pointer should indicate zero. Correct the adjustment position of the pointer by using correction value which is listed on the label of the alignment tape.	CH1 ⊘RV1/MA-44 (C-4) CH2 ⊘RV2/MA-44 (A-4)

APPLICATION : 10-3.

MA-44 board



10-4. AUDIO MONITOR OUT LEVEL CHECK

10-4-1. CH-1 Audio Monitor Out Level Check

Preparations for adjustment	Specifications	Adjustments
• AUDIO MONITOR switch (control panel): MIX • Pull the CH2 PB level control on the control panel, then fully turn it counterclockwise. (MIN) • Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1B PS.	AUDIO MONITOR OUT +4.0±0.5 dBm	(Check)

10-4-2. CH-2 Audio Monitor Out Level Check

Preparations for adjustment	Specifications	Adjustments
• AUDIO MONITOR switch (control panel): MIX • Pull the CH1 PB level control on the control panel, then fully turn it counterclockwise. (MIN) • Play back the 1 kHz, 0 VU signal portion (0: 00—2: 55) of the alignment tape CR8-1B PS.	AUDIO MONITOR OUT +4.0±0.5 dBm	(Check)

10-5. HEADPHONES LEVEL CHECK

Preparations for adjustment	Specifications	Adjustments
Step 1 • Connect a stereo phone plug to the HEADPHONES jack on the control panel, and connect three terminals of the plug to the audio level meter. (terminated by 8 Ω) • Turn the HEADPHONES volume level control on the control panel counterclockwise fully (MIN). • Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 55) of the alignment tape CR8-1A PS.	HEADPHONES connector OUT (CH1/CH2) −70 dBu or less	(Check)
Step 2 • Turn the HEADPHONES volume level control clockwise fully (MAX). • Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 55) of the alignment tape CR8-1A PS.	HEADPHONES connector OUT (CH1/CH2) −16±2 dBu	(Check)
Step 3 • Pull the CH2 PB level control on the control panel, then turn it counterclockwise fully. • Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 55) of the alignment tape CR8-1A PS.	HEADPHONES connector OUT (CH1/CH2) CH1 : −16±2 dBu CH2 : −55 dBu or less	(Check)
Step 4 • AUDIO MONITOR select switch (control panel) : CH1 • Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 55) of the alignment tape CR8-1A PS.	HEADPHONES connector OUT (CH1/CH2) CH1/CH2 −16±2 dBu	(Check)
Step 5 • AUDIO MONITOR select switch (control panel) : CH2 • Play back the 1 kHz, 0 VU signal portion (0 : 00—2 : 55) of the alignment tape CR8-1A PS. • After check is completed, set the AUDIO MONITOR select switch to MIX, and push the CH2 PB level control on the control panel.	HEADPHONES connector OUT (CH1/CH2) CH1/CH2 −70 dBu or less	(Check)

SECTION 11
VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
  Composite SG (TEKTRONIX 1411 or equivalent)
- Waveform Monitor
  Component (TEKTRONIX WFM300/WFM300A/1781R or equivalent)
  Composite (TEKTRONIX 1481C/1751/1781R or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B/D or equivalent)
- Picture Monitor
- Frequency Counter
- Blank Tape (oxide) BCT-20G
- Blank Tape (metal) BCT-20M

  NOTE: "Blank Tape" indicates a cassette tape on which no video/audio signals are recorded.
- Alignment Tape CR5-2A PS (part No. 8-960-098-44)

Contents

TIME min s	VIDEO TRACK
0: 00	75% Color Bars
3: 00	60% Multi Burst Y: 0.5,1.0,2.0,3.0,4.1,4.5 MHz C: 0.2,0.5,1.0,1.5,2.0 MHz
6: 00	50% Bowtie & 10T
9: 00	Pulse & Bar
11: 00	Quad Phase
13: 00 15: 00	Composite Monoscope

- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

Contents

TIME min s	VIDEO TRACK	AFM
0 : 00	RF Sweep Marker 1,2,4,6,8,10,12 MHz	No-Signal
2 : 00	60% H-Sweep (CTDM) Marker 0.5,1,2,3,4,5 MHz	
5 : 00	Pulse & Bar (CTDM)	
8 : 00	Multi Burst Y : 0.5,1,2,4,5,5.5 MHz C : 0.2, 0.5,1,1.5,2 MHz	
11 : 00	Pulse & Bar	
14 : 00	100% Color Bars	400 Hz Sine Wave 25 kHz Deviation
16 : 30		75 kHz Deviation
17 : 00	50% Bowtie & 10T	No-Signal
19 : 00	Line 17A signal	
22 : 00	Quad Phase	
24 : 00	50% Flat Field	
26 : 00	100% Color Bars with Dropout	
28 : 00	Composite H-Sweep with VISC	
30 : 00		

[Switch/Setup menu Setting]

This setting should not be changed in position unless otherwise specified.

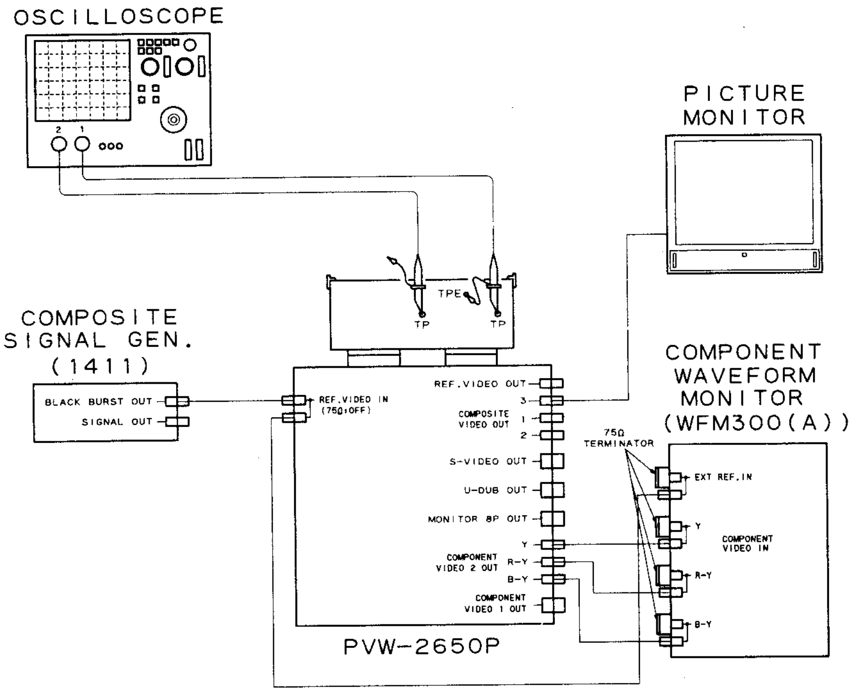
<Control Panel>
upper
LOCAL/REMOTE: LOCAL
lower
CTL/TC/U-BIT: TC

<Sub Control Panel>
CHARACTER: ON
TC: LTC
CAPSTAN LOCK: 8 FD
TBC CONTROL: LOCAL
VIDEO: PRESET
CHROMA: PRESET
SET UP: PRESET
Y/C DELAY: PRESET

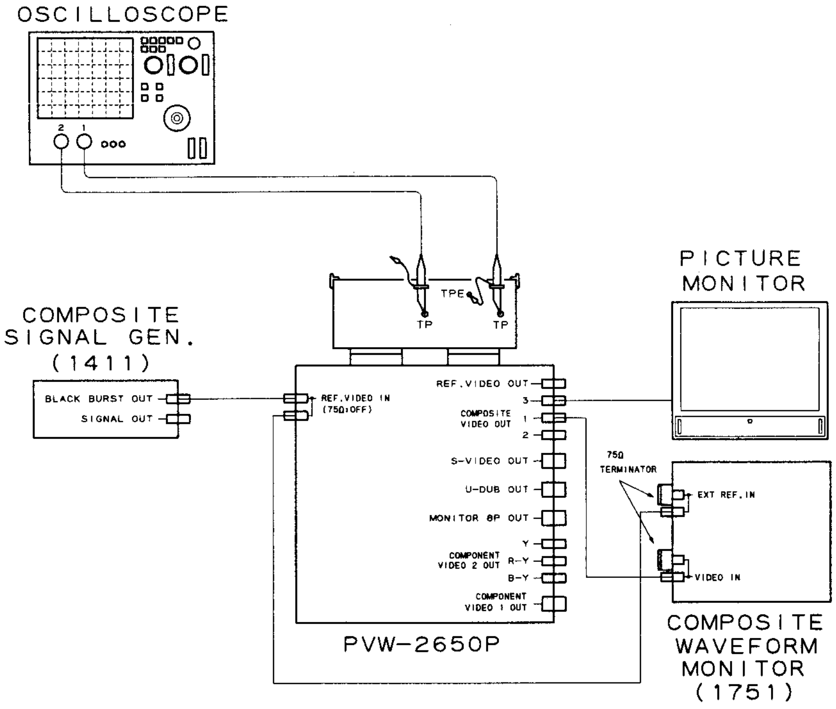
[Connection]

Connect some equipment as following unless otherwise specified.

CONNECTION 1 SG 1411/Waveform Monitor WFM-300 (A)/Oscilloscope/Picture Monitor


OSCILLOSCOPE
2
1
PICTURE MONITOR
TPE
TP
TP
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P
COMPONENT WAVEFORM MONITOR (WFM300(A))
75Ω TERMINATOR
EXT REF.IN
Y
COMPONENT VIDEO IN
R-Y
B-Y

CONNECTION 2 SG1411/Waveform Monitor1751/Oscilloscope/Picture Monitor

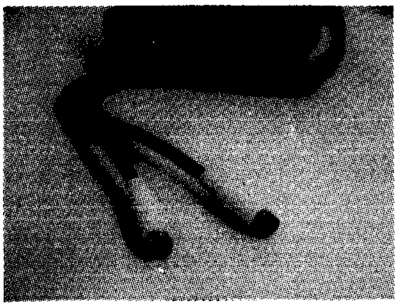

OSCILLOSCOPE
2
1
PICTURE MONITOR
TPE
TP
TP
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
COMPOSITE VIDEO OUT
3
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
COMPONENT VIDEO 2 OUT
Y
R-Y
B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P
75Ω TERMINATOR
EXT REF.IN
VIDEO IN
COMPOSITE WAVEFORM MONITOR (1751)

[Preparations and Notes on Alignment]

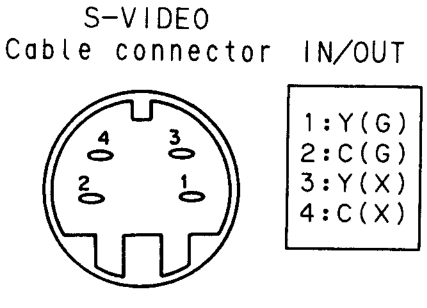
Making the cable for measuring S-VIDEO input/output level

S-terminal (Y/C) convert cable (BNC x 2) is necessary to measuring S-VIDEO input/output level.

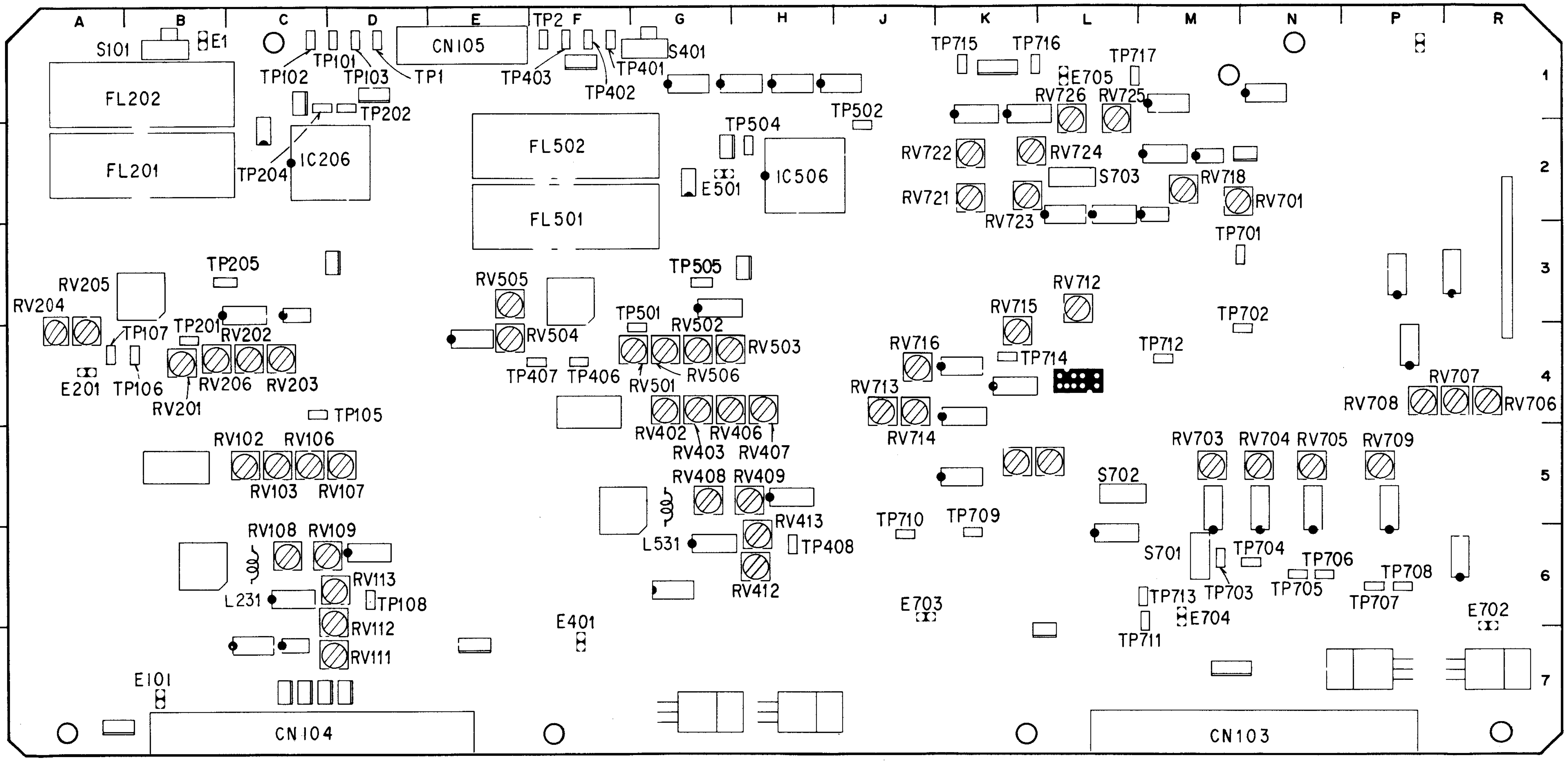
Preparation: S-S terminal connection cable about 5 meters in length (standard product) (SONY YC-50KV)

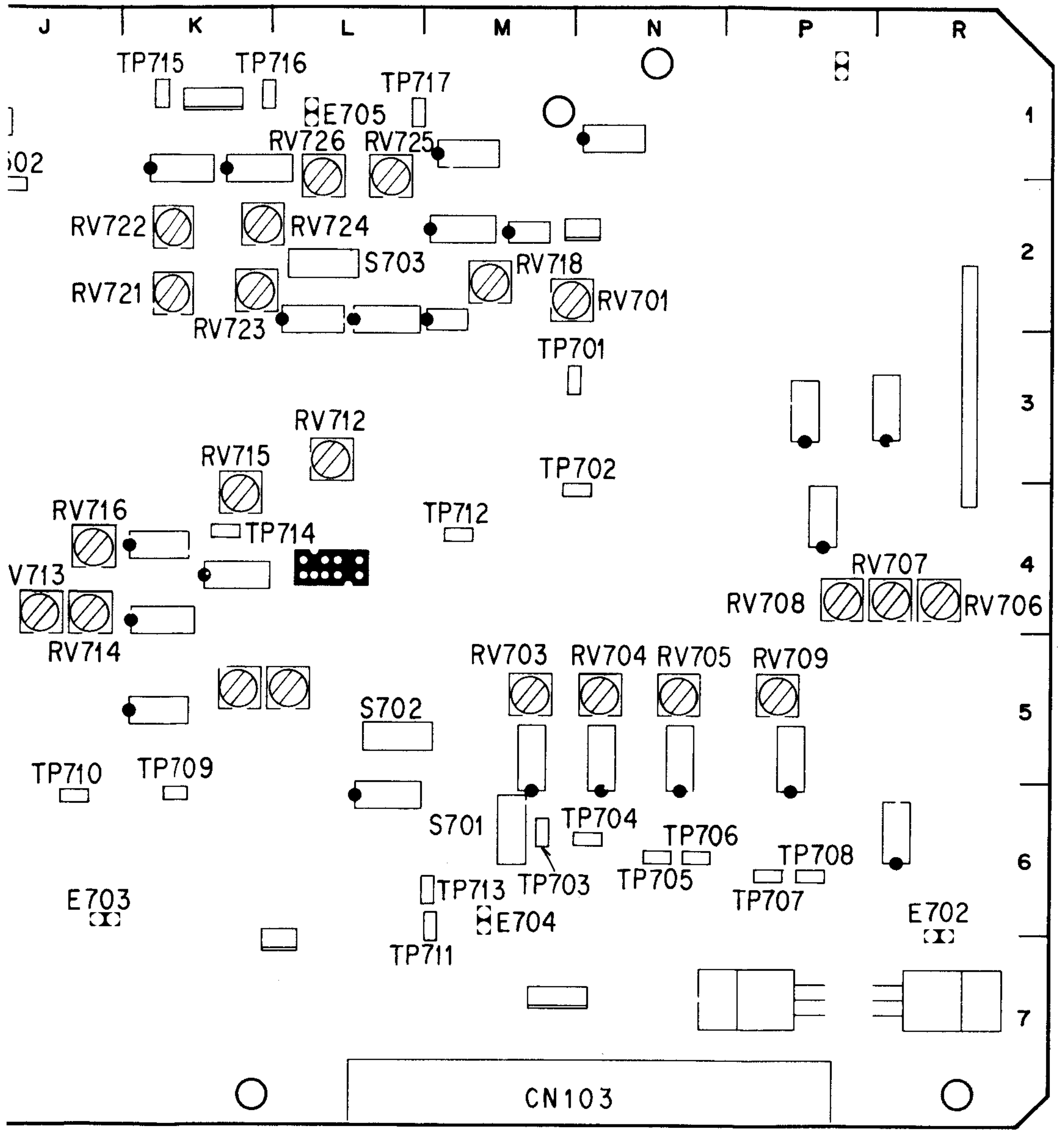


1. Cut the cable in half.
2. Tear and strip the cover of the cable with a cutter.
3. Strip the cover of the shield wire with a nipper.
4. Check the Y/C core wire with a tester.
5. Solder the BNC terminal for Y signal to the shield wire of Y signal in the cable and the BNC terminal for C signal to the shield wire of C signal. (Check the continuity with a tester.)

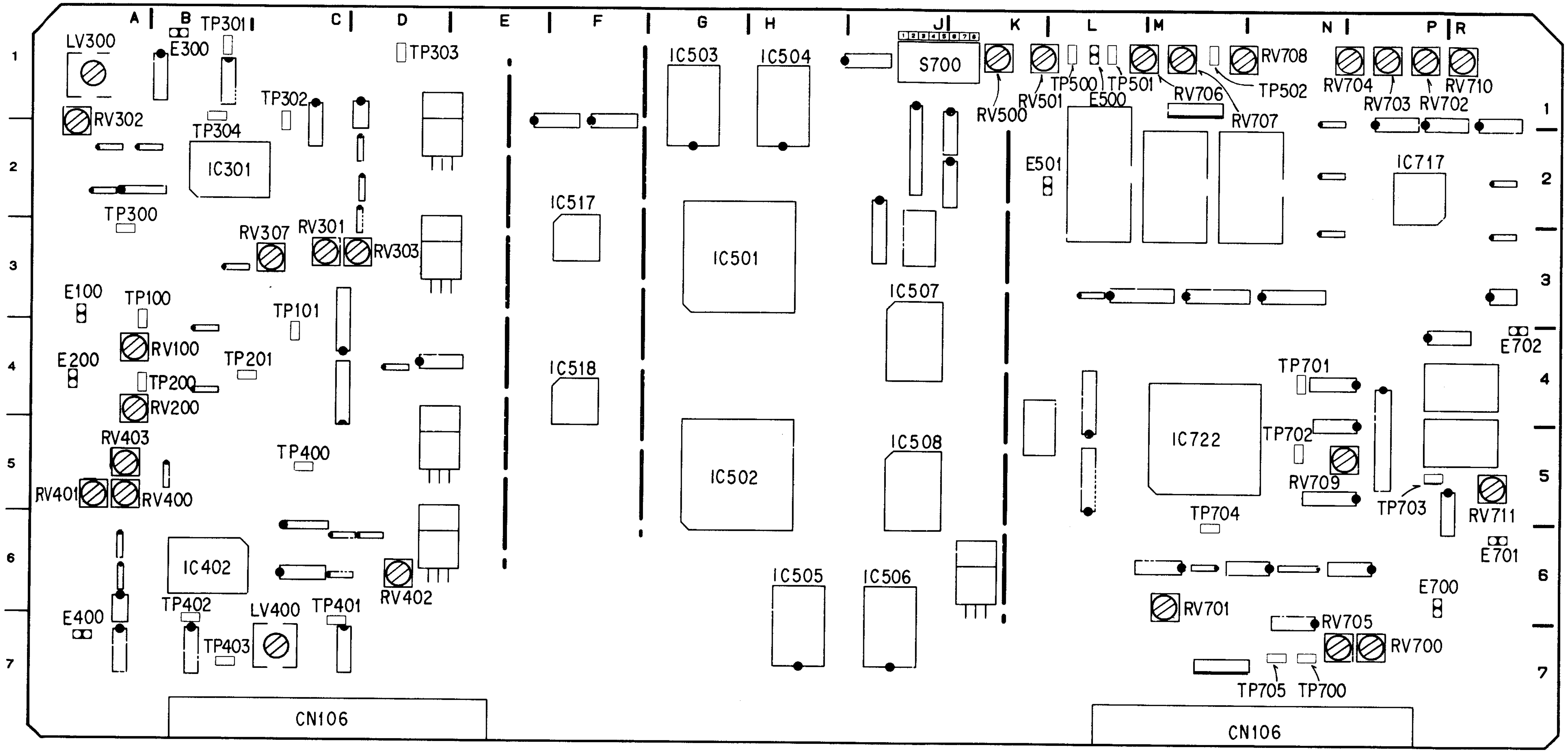

S-VIDEO
Cable connector IN/OUT
4
3
2
1
1:Y(G)
2:C(G)
3:Y(X)
4:C(X)

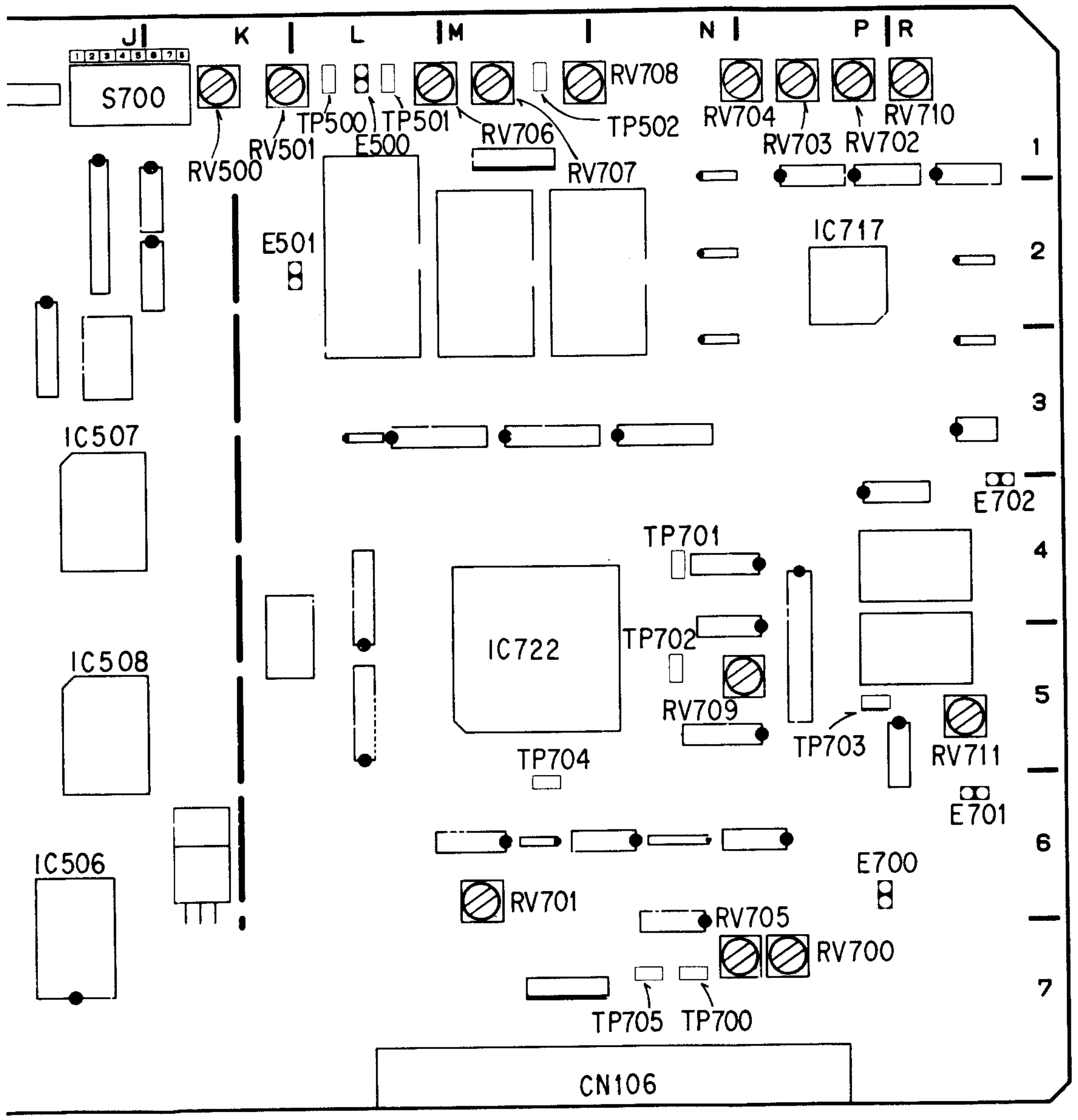
VP-33 board (A side)


A
B
C
D
E
TP2 F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
7
S101
E1
TP102
TP101
TP103
TP1
CN105
TP403
TP402
TP401
S401
FL202
FL201
TP202
TP204
IC206
FL502
FL501
TP504
TP502
E501
IC506
TP715
TP716
TP717
E705
RV726
RV725
RV722
RV724
S703
RV718
RV721
RV723
RV701
TP701
TP205
RV205
RV204
TP107
TP201
RV202
E201
TP106
RV206
RV203
RV201
TP105
RV505
RV504
TP407
TP406
TP505
TP501
RV502
RV503
RV501
RV506
RV712
RV715
RV716
TP714
TP712
TP702
RV713
RV714
RV707
RV708
RV706
RV402
RV403
RV406
RV407
RV102
RV106
RV103
RV107
RV408
RV409
RV703
RV704
RV705
RV709
S702
L531
RV413
TP408
TP710
TP709
RV108
RV109
RV113
TP108
L231
RV112
RV111
RV412
S701
TP704
TP706
TP708
TP713
TP703
TP705
TP707
E703
E704
E702
TP711
E401
E101
CN104
CN103


J
K
L
M
N
P
R
1
2
3
4
5
6
7
TP715
TP716
TP717
E705
RV726
RV725
02
RV722
RV724
S703
RV718
RV701
RV721
RV723
TP701
RV712
RV715
TP702
RV716
TP714
TP712
V713
RV707
RV708
RV706
RV714
RV703
RV704
RV705
RV709
S702
TP710
TP709
S701
TP704
TP706
TP708
TP713
TP703
TP705
TP707
E703
E704
E702
TP711
CN103

TBC-18 board (A side)


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
7
LV300
E300
TP301
TP303
RV302
TP304
TP302
IC301
TP300
RV307
RV301
RV303
E100
TP100
TP101
RV100
E200
TP201
TP200
RV200
RV403
TP400
RV401
RV400
IC402
RV402
E400
TP402
LV400
TP401
TP403
CN106
IC517
IC518
IC503
IC504
IC501
IC502
IC505
IC506
IC507
IC508
1 2 3 4 5 6 7 8
S700
RV500
RV501
TP500
TP501
E500
RV706
RV707
TP502
RV708
RV704
RV703
RV702
RV710
E501
IC717
E702
TP701
IC722
TP702
RV709
TP703
RV711
E701
TP704
E700
RV701
RV705
RV700
TP705
TP700
CN106


J
K
L
M
N
P
R
1
2
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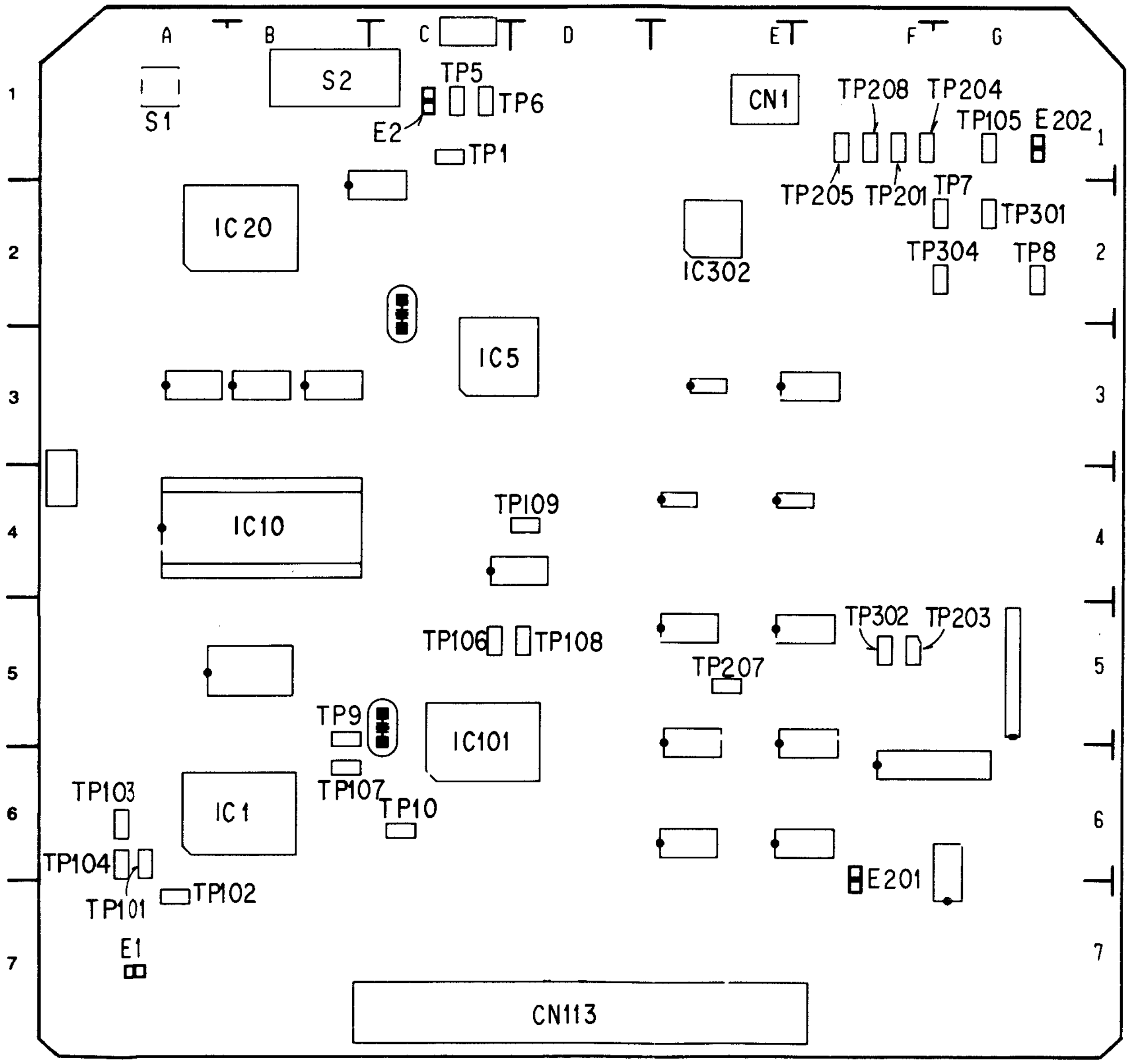
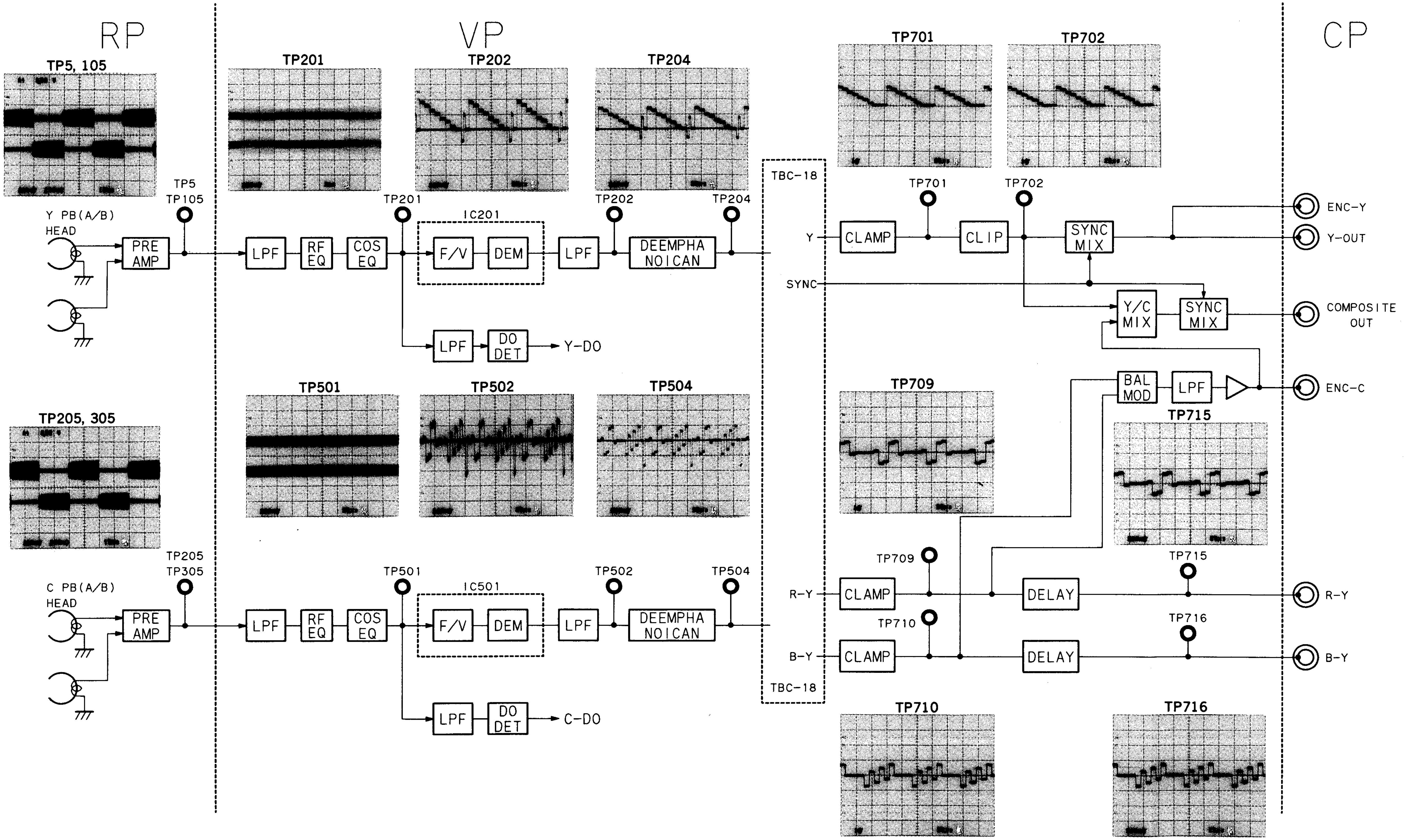
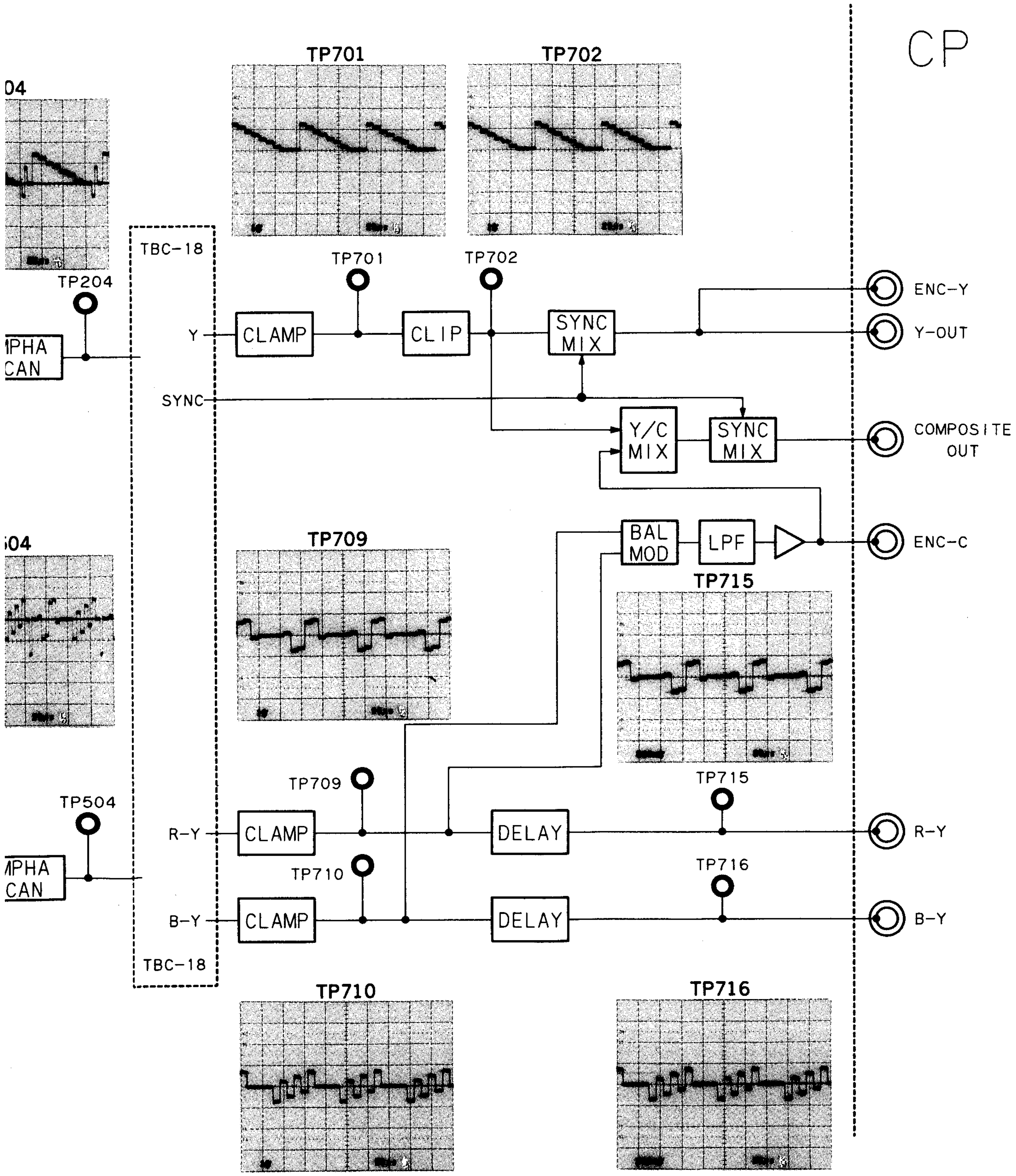
4
5
6
7
S700
RV500
RV501
TP500
E500
TP501
RV706
RV707
TP502
RV708
RV704
RV703
RV702
RV710
E501
IC717
IC507
IC508
IC506
IC722
TP701
TP702
RV709
TP703
RV711
TP704
E702
E701
E700
RV701
RV705
RV700
TP705
TP700
CN106

DT-30 board (A Side)

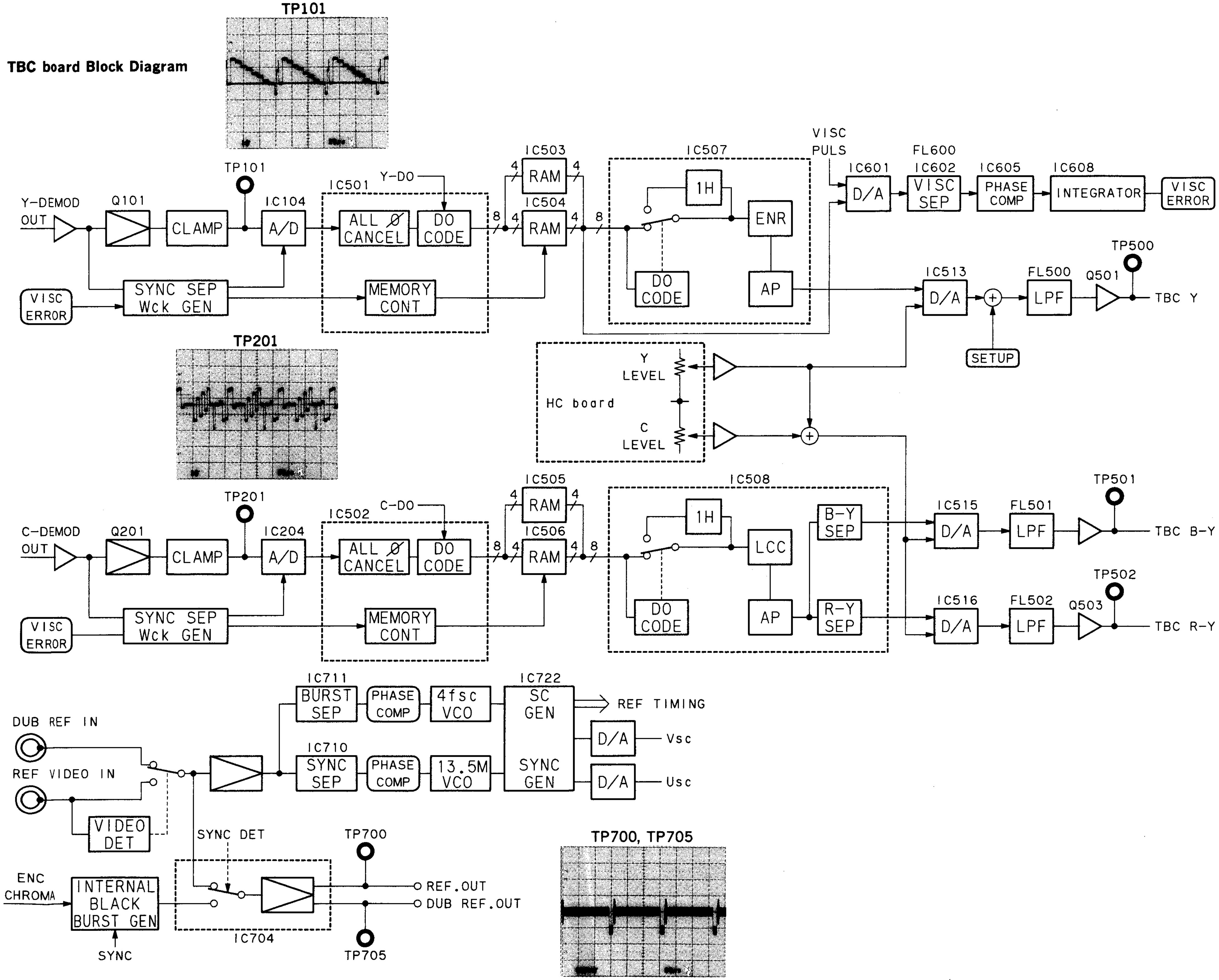

A
B
C
D
E
F
G
1
2
3
4
5
6
7
S1
S2
TP5
TP6
E2
TP1
CN1
TP208
TP204
TP105
E202
TP205
TP201
TP7
TP301
TP304
TP8
IC20
IC302
IC5
IC10
TP109
TP106
TP108
TP302
TP203
TP207
TP9
IC101
TP103
IC1
TP107
TP10
TP104
TP101
TP102
E201
E1
CN113

VP-33 board Block Diagram

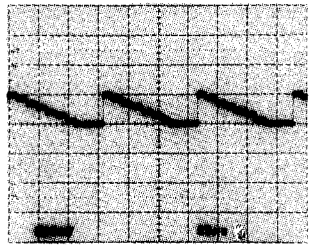

RP
VP
CP
TP5, 105
TP201
TP202
TP204
TP701
TP702
TP5
TP105
TP201
TP202
TP204
TP701
TP702
Y PB(A/B)
HEAD
PRE
AMP
LPF
RF
EQ
COS
EQ
IC201
F/V
DEM
LPF
DEEMPHA
NOICAN
TBC-18
Y
CLAMP
CLIP
SYNC
MIX
ENC-Y
Y-OUT
SYNC
Y/C
MIX
SYNC
MIX
COMPOSITE
OUT
LPF
DO
DET
Y-DO
BAL
MOD
LPF
ENC-C
TP501
TP502
TP504
TP709
TP715
TP205, 305
TP205
TP305
C PB(A/B)
HEAD
PRE
AMP
LPF
RF
EQ
COS
EQ
TP501
IC501
F/V
DEM
LPF
TP502
DEEMPHA
NOICAN
TP504
TP709
TP715
R-Y
CLAMP
DELAY
R-Y
TP710
TP716
B-Y
CLAMP
DELAY
B-Y
TBC-18
LPF
DO
DET
C-DO
TP710
TP716


04
TP701
TP702
CP
TBC-18
TP204
PHA
CAN
Y
CLAMP
TP701
CLIP
TP702
SYNC MIX
ENC-Y
Y-OUT
SYNC
Y/C MIX
SYNC MIX
COMPOSITE OUT
04
TP709
BAL MOD
LPF
ENC-C
TP715
TP709
TP715
TP504
R-Y
CLAMP
DELAY
R-Y
TP710
TP716
PHA
CAN
B-Y
CLAMP
DELAY
B-Y
TBC-18
TP710
TP716

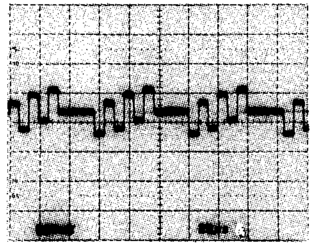
TBC board Block Diagram


TP101
Y-DEMOD OUT
Q101
CLAMP
TP101
IC104
A/D
IC501
Y-DO
ALL Ø CANCEL
DO CODE
MEMORY CONT
SYNC SEP Wck GEN
VISC ERROR
IC503
RAM
IC504
RAM
4
8
IC507
1H
ENR
DO CODE
AP
VISC PULS
IC601
D/A
FL600
IC602
VISC SEP
IC605
PHASE COMP
IC608
INTEGRATOR
VISC ERROR
TP500
IC513
D/A
SETUP
FL500
LPF
Q501
TBC Y
TP201
HC board
Y LEVEL
C LEVEL
C-DEMOD OUT
Q201
CLAMP
TP201
IC204
A/D
IC502
C-DO
ALL Ø CANCEL
DO CODE
MEMORY CONT
SYNC SEP Wck GEN
VISC ERROR
IC505
RAM
IC506
RAM
IC508
1H
LCC
B-Y SEP
R-Y SEP
DO CODE
AP
IC515
D/A
FL501
LPF
TP501
TBC B-Y
IC516
D/A
FL502
LPF
Q503
TP502
TBC R-Y
DUB REF IN
REF VIDEO IN
VIDEO DET
IC711
BURST SEP
PHASE COMP
4fsc VCO
IC710
SYNC SEP
PHASE COMP
13.5M VCO
IC722
SC GEN
SYNC GEN
REF TIMING
D/A
Vsc
D/A
Usc
SYNC DET
ENC CHROMA
INTERNAL BLACK BURST GEN
SYNC
IC704
TP700
REF.OUT
DUB REF.OUT
TP705
TP700, TP705

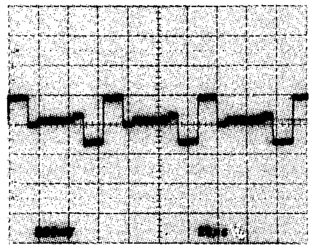
TP500

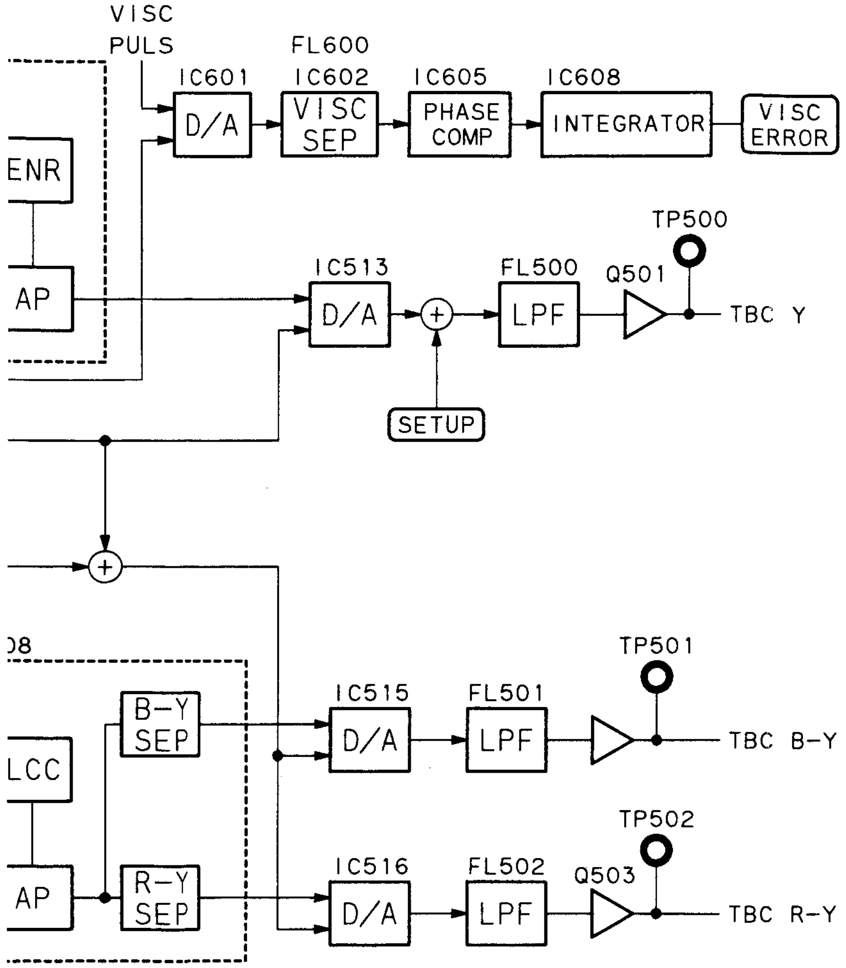


TP501

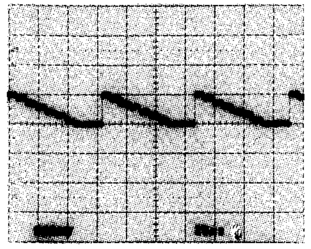


TP502

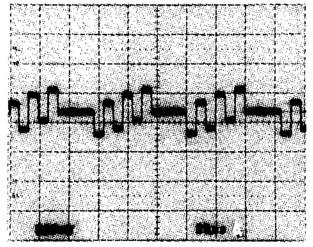



VISC
PULS
FL600
IC601
IC602
IC605
IC608
D/A
VISC SEP
PHASE COMP
INTEGRATOR
VISC ERROR
ENR
AP
TP500
IC513
FL500
Q501
D/A
LPF
TBC Y
SETUP
)8
TP501
IC515
FL501
B-Y SEP
D/A
LPF
TBC B-Y
LCC
TP502
IC516
FL502
Q503
AP
R-Y SEP
D/A
LPF
TBC R-Y

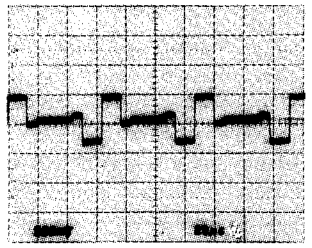
TP500



TP501

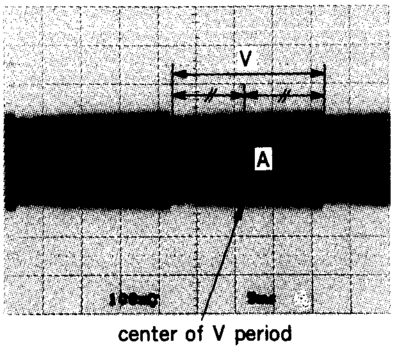


TP502

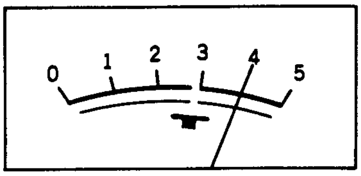


11-1. VP BOARD (RF, DM SYSTEM) ADJUSTMENT

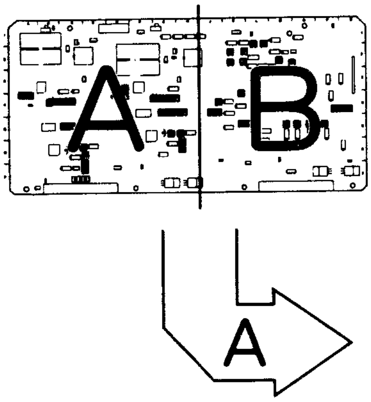
11-1-1. Y PB RF Level Adjustment (Metal)

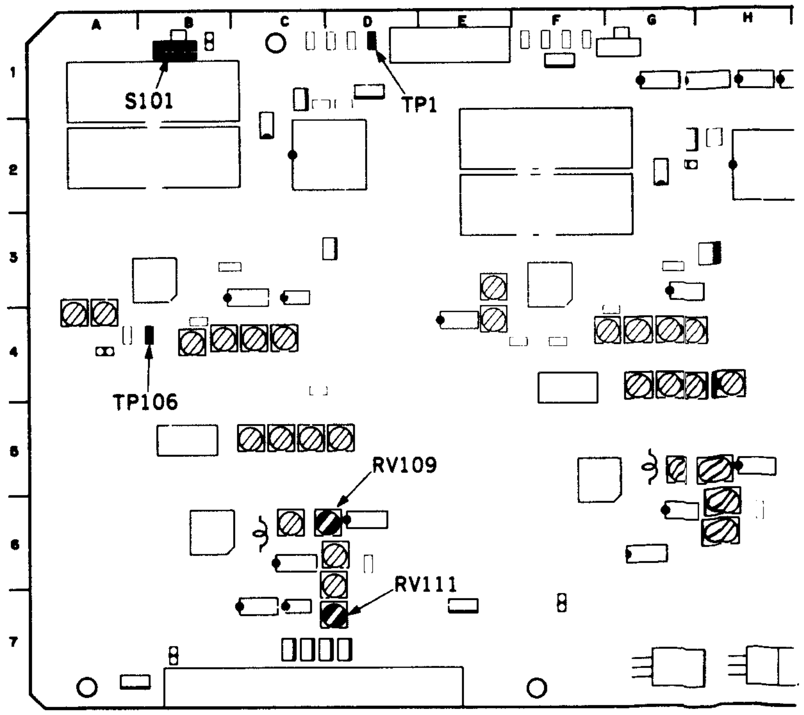
Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. NOTE : S101/VP-33 (B-1): ON (S101 : Y RF AGC SW)	TP106/VP-33 (B-4) oscilloscope  A=200±10 mV p-p	⊘RV109/VP-33 (D-6) TRIG: TP1/VP-33 (D-1) CONNECTION 1

11-1-2. RF Meter Adjustment (Metal)

Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS.	RF meter (control panel)  The pointer of the meter should indicate 4.	⊘RV111/VP-33 (D-7) CONNECTION 1

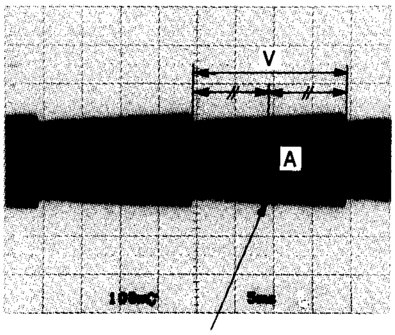
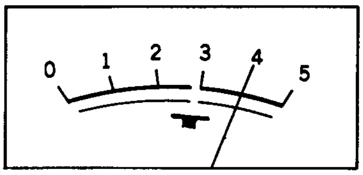
VP-33 board

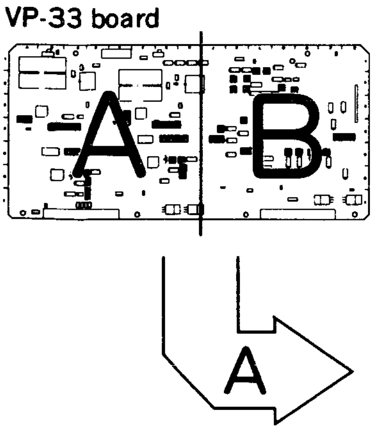




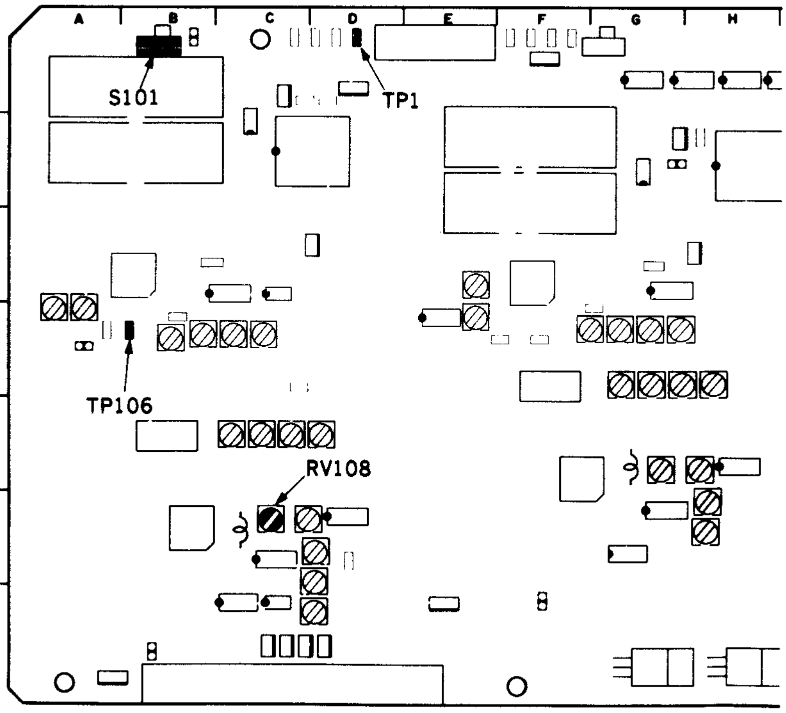
APPLICATION : 11-1-1.
11-1-2.

11-1-3. Y PB RF Level Adjustment (Oxide)

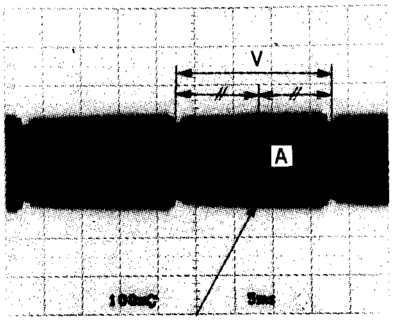
Preparations for adjustment	Specifications	Adjustments
- Play back the color bars signal portion (0:00 — 3:00) of the alignment tape CR5-2A PS. **NOTE** : S101/VP-33 (B-1): ON (S101 : Y RF AGC SW)	TP106/VP-33 (B-4) oscilloscope  center of V period A=200±10 mV p-p	⊘RV108/VP-33 (C-6) TRIG: TP1/VP-33 (D-1) CONNECTION 1
	RF meter (control panel)  The pointer of the meter should indicate "$4.0^{+0.5}_{-1.0}$" .	(Check)


VP-33 board
A
B
A

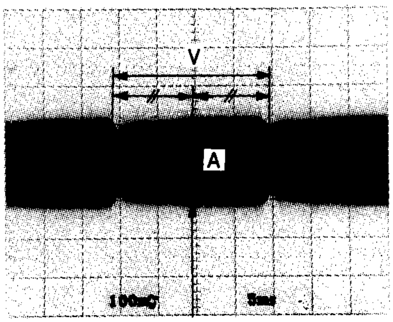
APPLICATION : 11-1-3.


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
S101
TP1
TP106
RV108

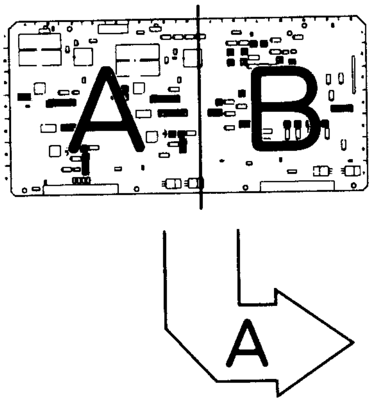
11-1-4. C PB RF Level Adjustment (Metal)

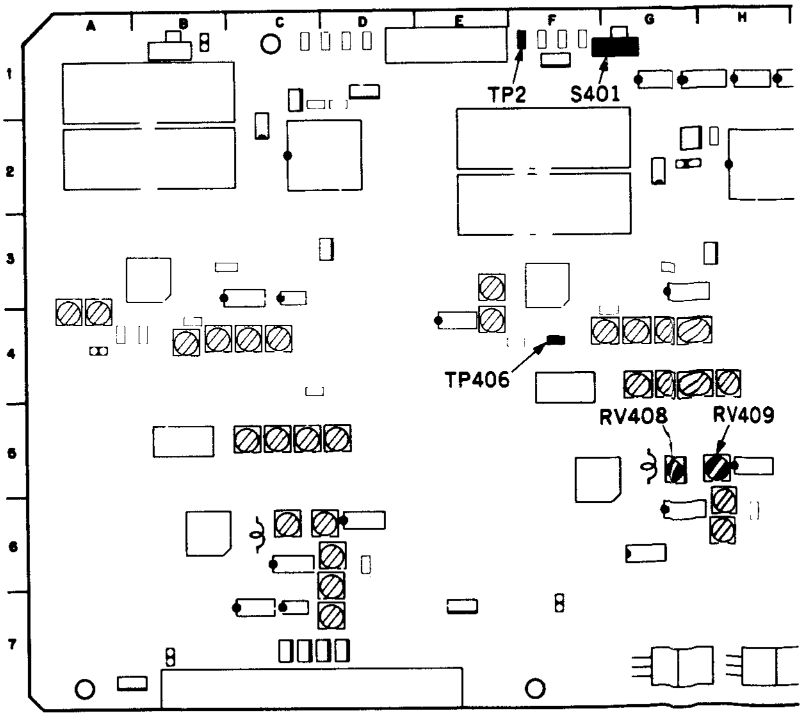
Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. **NOTE** : S401/VP-33 (G-1): ON (S401 : C RF AGC SW)	TP406/VP-33 (F-4) oscilloscope  center of V period A=200±10 mV p-p	●RV409/VP-33 (H-5) TRIG: TP2/VP-33 (F-1) CONNECTION 1

11-1-5. C PB RF Level Adjustment (Oxide)

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (0:00—3:00) of the alignment tape CR5-2A PS. **NOTE** : S401/VP-33 (G-1): ON (S401 : C RF AGC SW)	TP406/VP-33 (F-4) oscilloscope  center of V period A=200±10 mV p-p	●RV408/VP-33 (G-5) TRIG: TP2/VP-33 (F-1) CONNECTION 1

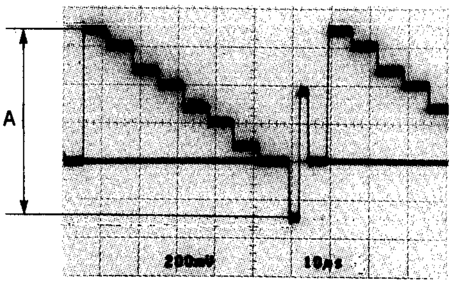
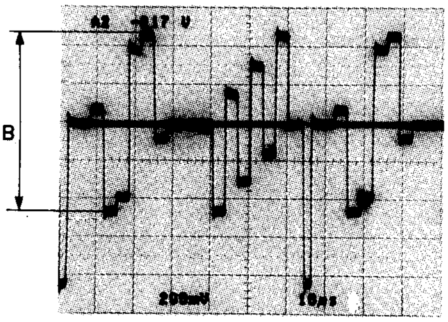
VP-33 board



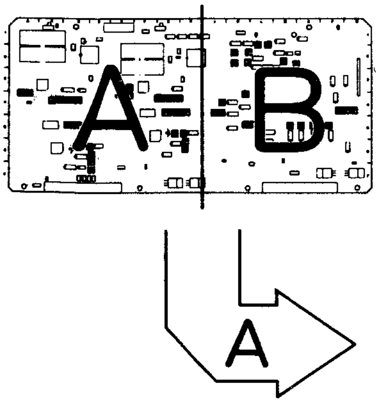


APPLICATION : 11-1-4.
11-1-5.

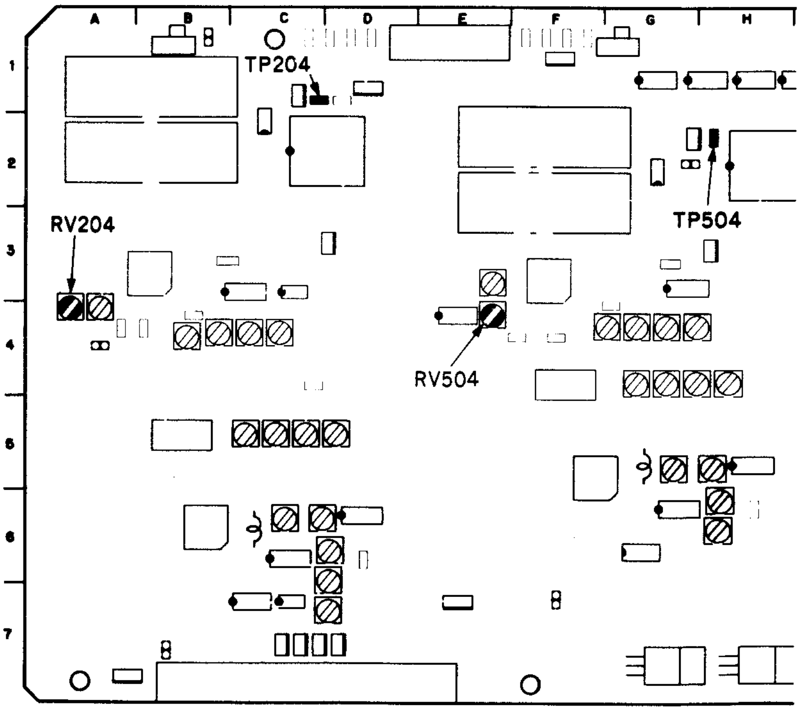
11-1-6. Y and C Demodulator Gain Adjustment (Metal)

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS.	TP204/VP-33 (C-1) oscilloscope  A=1.00±0.02 V p-p	(A) (Y METAL DM GAIN) ⊘RV204/VP-33 (A-4) TRIG: INT CONNECTION 1
	TP504/VP-33 (H-2) oscilloscope  B=933±20 mV p-p	(B) (C METAL DM GAIN) ⊘RV504/VP-33 (E-4) TRIG: INT CONNECTION 1

VP-33 board

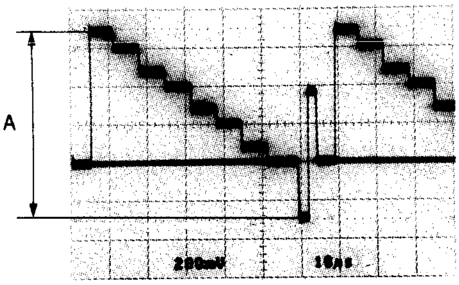
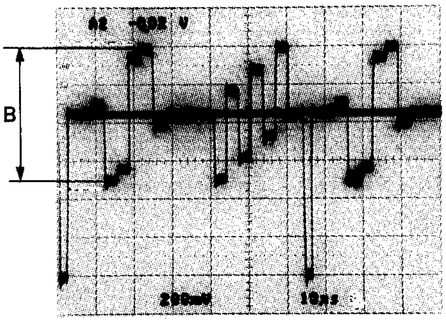


APPLICATION : 11-1-6.

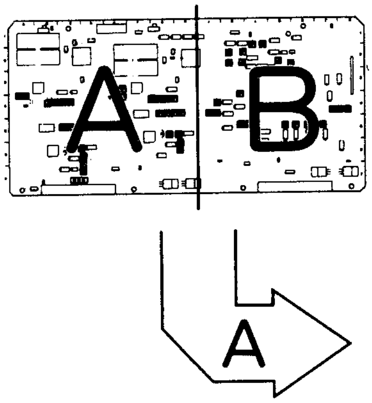


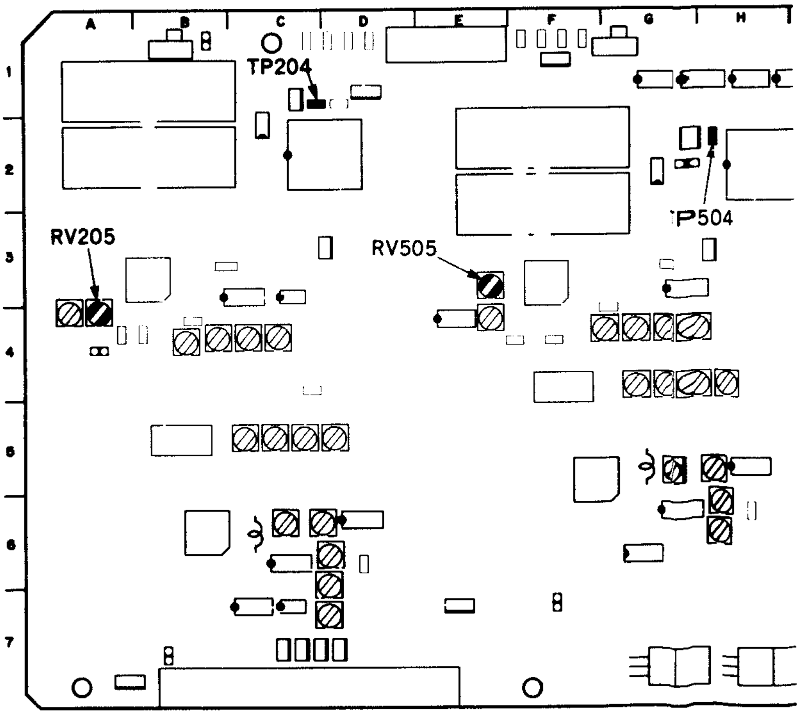
A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
TP204
RV204
TP504
RV504

11-1-7. Y/C Demodulator Gain Adjustment (Oxide)

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (0:00—3:00) of the alignment tape CR5-2A PS.	TP204/VP-33 (C-1) oscilloscope  A=1.00±0.02 V p-p	(A) (Y OXIDE DM GAIN) ⊘RV205/VP-33 (A-4) TRIG: INT CONNECTION 1
	TP504/VP-33 (H-2) oscilloscope  B=700±20 mV p-p	(B) (C OXIDE DM GAIN) ⊘RV505/VP-33 (E-3) TRIG: INT CONNECTION 1

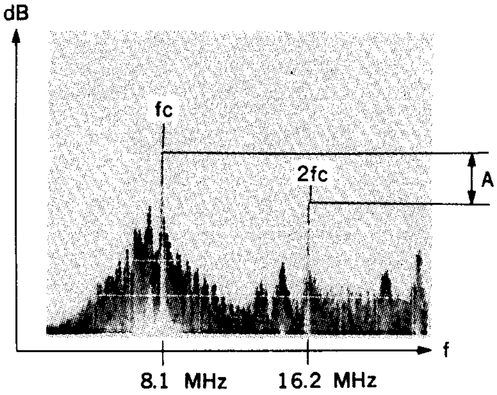
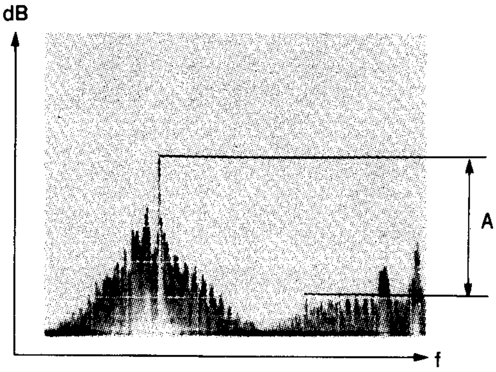
VP-33 board



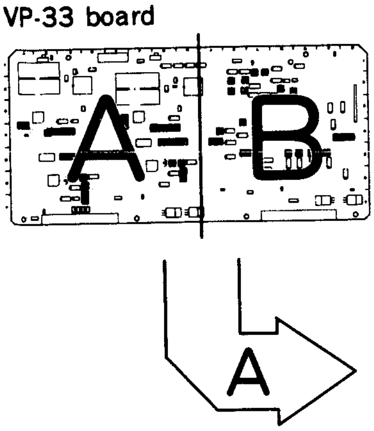

A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
TP204
RV205
RV505
TP504

APPLICATION: 11-1-7.

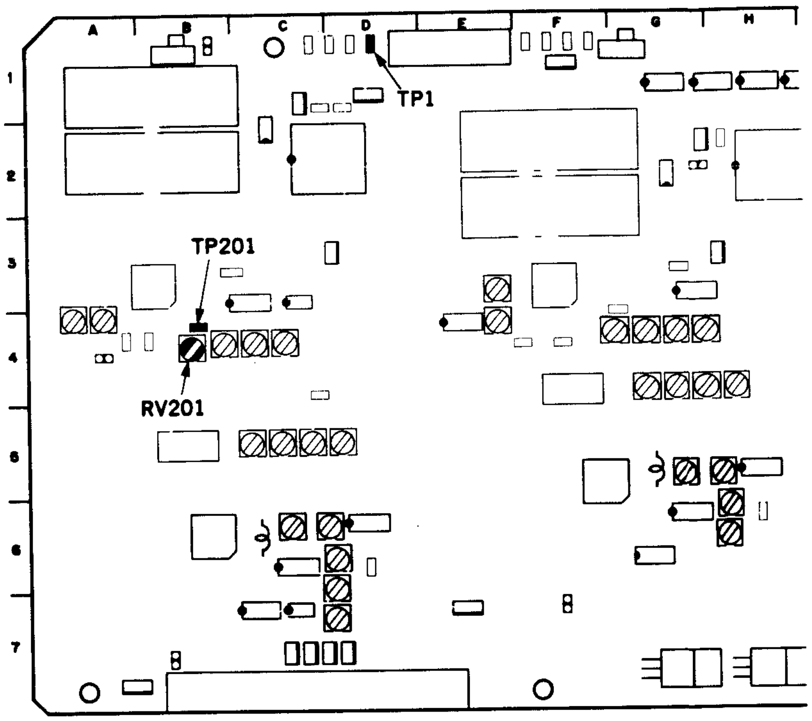
11-1-8. Y and C Limiter Balance Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. • Connect the spectrum analyzer to OUTPUT terminal of the oscilloscope.	TP201/VP-33 (B-4) spectrum analyzer Before adjustment  ⇩ After adjustment  A≧40 dB	(A) (Y LIMITER BALANCE) ⊘RV201/VP-33 (B-4) TRIG: TP1/VP-33 (D-1)

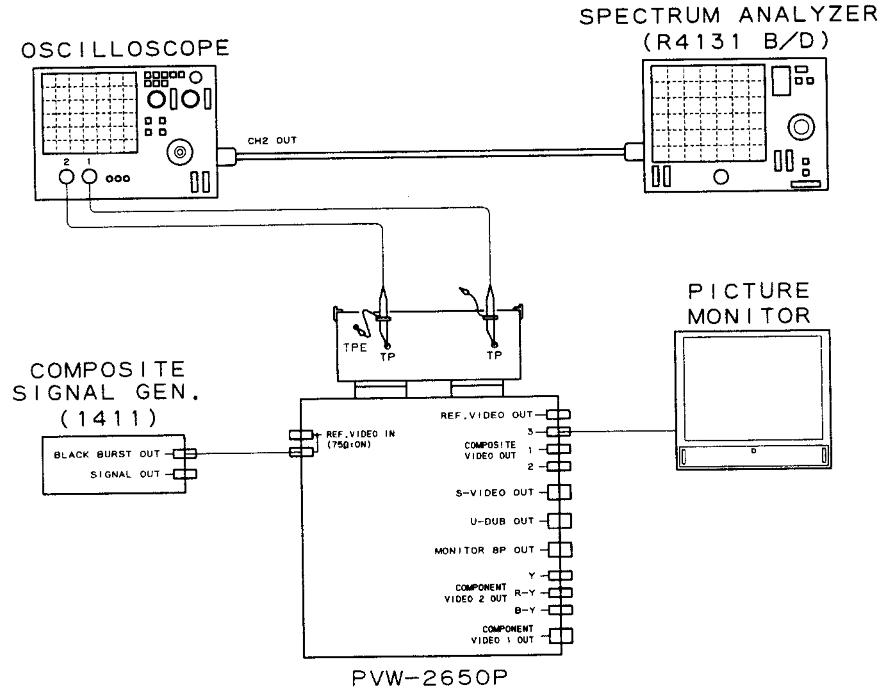
Continues to the next page.


VP-33 board
A
B
A

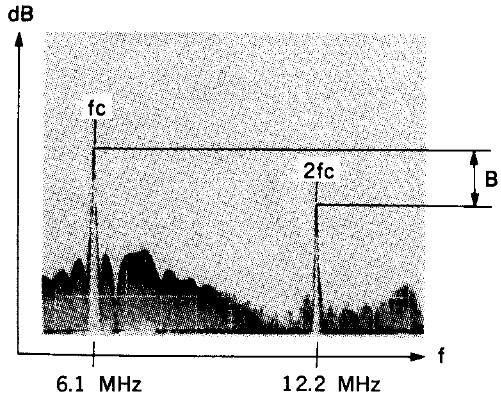
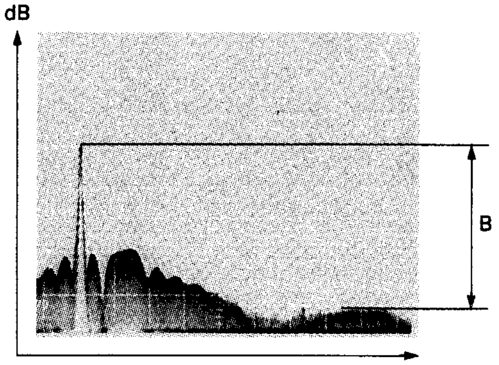
APPLICATION : 11-1-8.


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
TP1
TP201
RV201

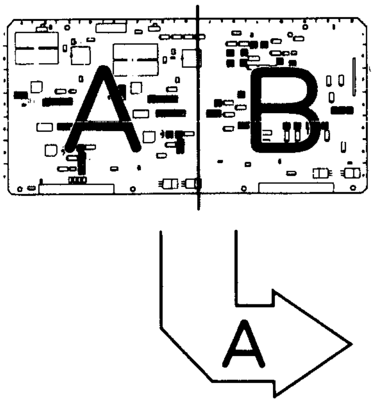
[CONNECTION]


OSCILLOSCOPE
2
1
CH2 OUT
SPECTRUM ANALYZER
(R4131 B/D)
TPE
TP
TP
PICTURE
MONITOR
COMPOSITE
SIGNAL GEN.
(1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN
(75Ω:ON)
REF.VIDEO OUT
3
COMPOSITE
VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT
VIDEO 2 OUT
R-Y
B-Y
COMPONENT
VIDEO 1 OUT
PVW-2650P

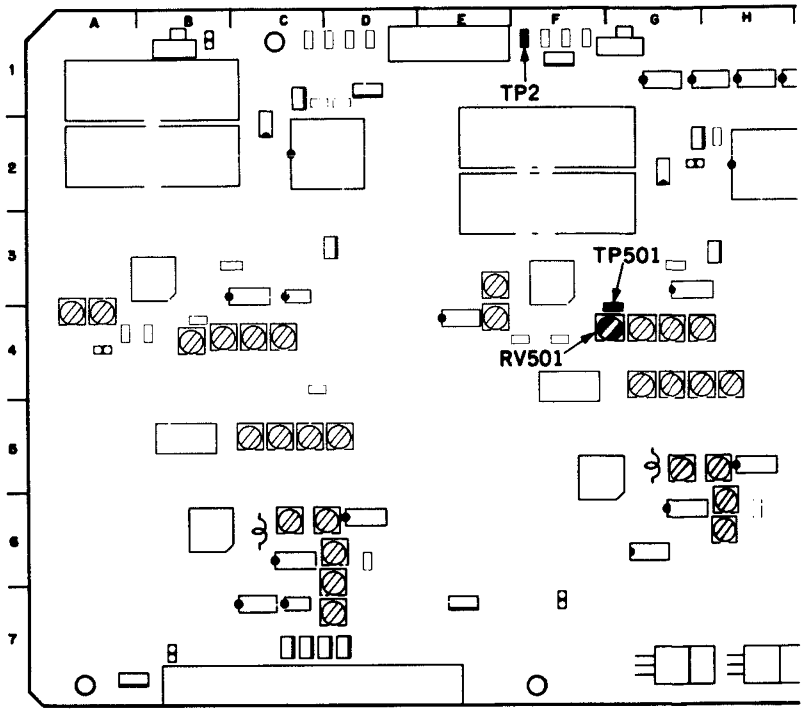
11-1-8. Y and C Limiter Balance Adjustment (Continued)

Preparations for adjustment	Specifications	Adjustments
- Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. - Connect the spectrum analyzer to OUTPUT terminal of the oscilloscope.	TP501/VP-33 (G-4) spectrum analyzer Before adjustment  ⇩ After adjustment  B≧40 dB	(B) (C LIMITER BALANCE) ⊘RV501/VP-33 (G-4) TRIG: TP2/VP-33 (F-1)

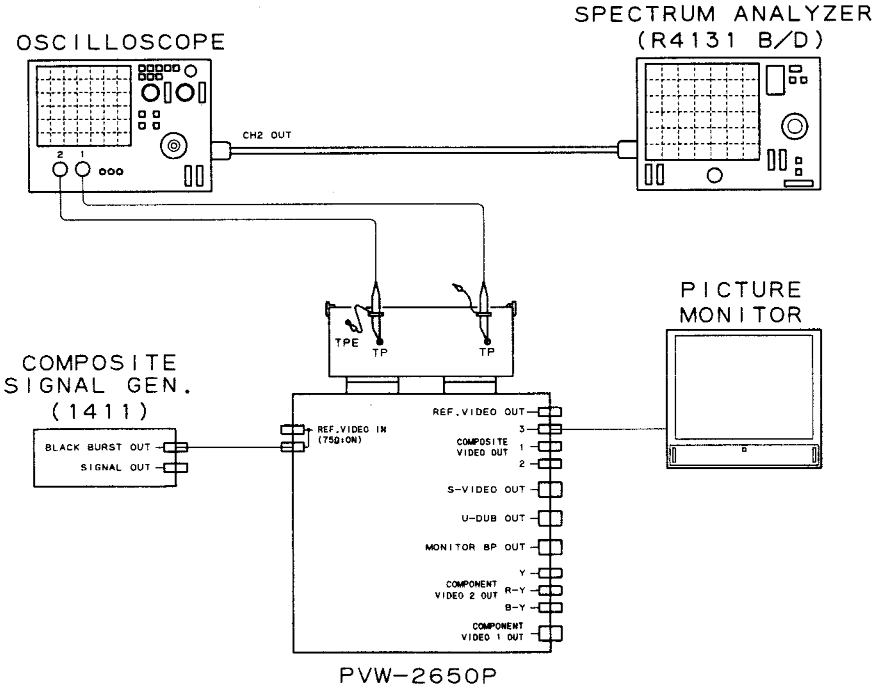
VP-33 board



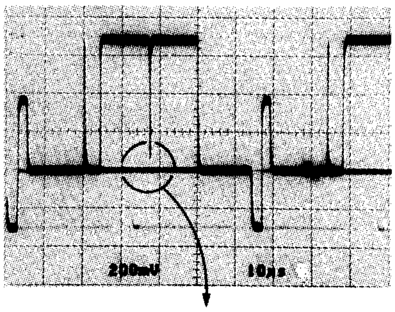
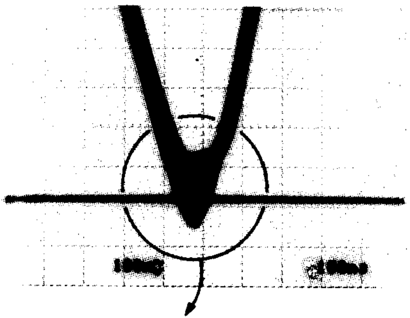
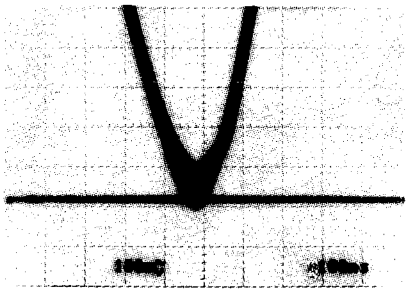
APPLICATION : 11-1-8.


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
TP2
TP501
RV501

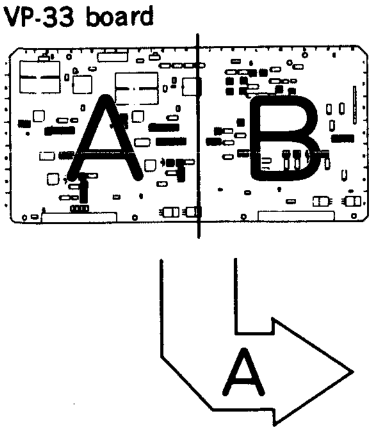
[CONNECTION]


OSCILLOSCOPE
2
1
CH2 OUT
SPECTRUM ANALYZER
(R4131 B/D)
TPE
TP
TP
PICTURE
MONITOR
COMPOSITE
SIGNAL GEN.
(1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN
(75Ω:ON)
REF.VIDEO OUT
COMPOSITE
VIDEO OUT
3
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR BP OUT
COMPONENT
VIDEO 2 OUT
Y
R-Y
B-Y
COMPONENT
VIDEO 1 OUT
PVW-2650P

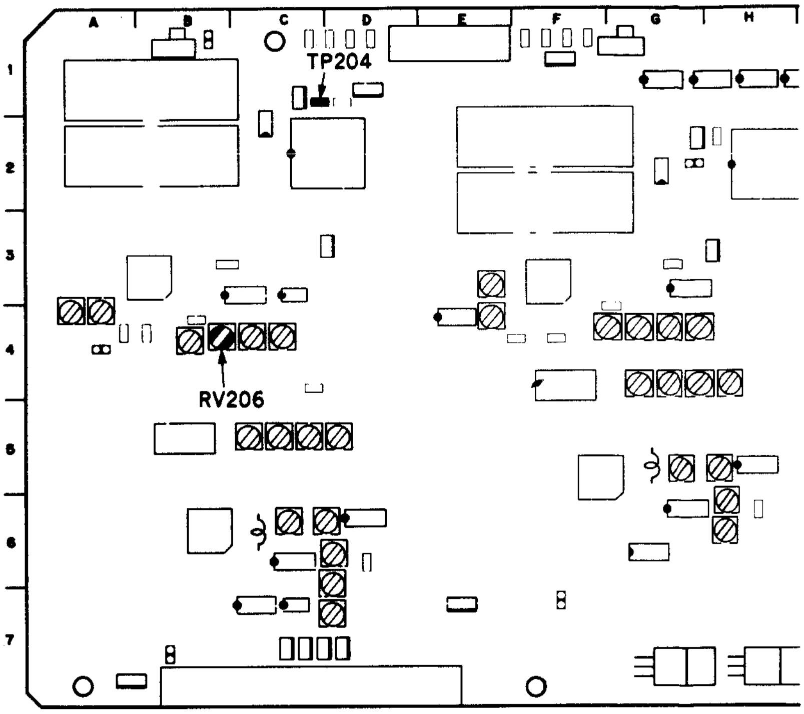
11-1-9. Y and C Demodulator Balance Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the pulse & bar signal portion (11:00—14:00) of the alignment tape CR5-1B PS.	TP204/VP-33 (C-1) oscilloscope  Before adjustment  Minimize the moire. ⇩ After adjustment 	(A) (Y DEMOD BALANCE) ●RV206/VP-33 (B-4) TRIG: INT (−) CONNECTION 1

Continues to the next page.


VP-33 board
A
B
A

APPLICATION : 11-1-9.


A
B
C
D
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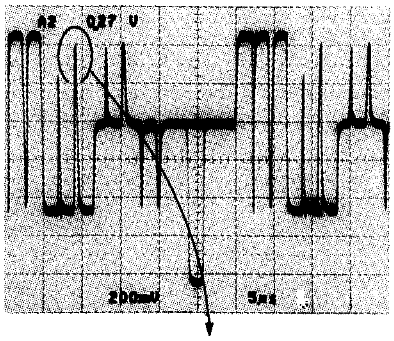
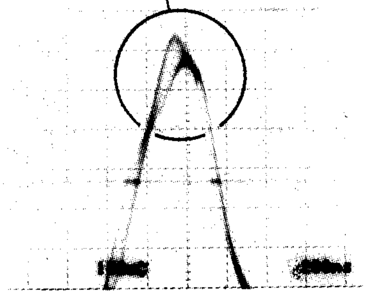
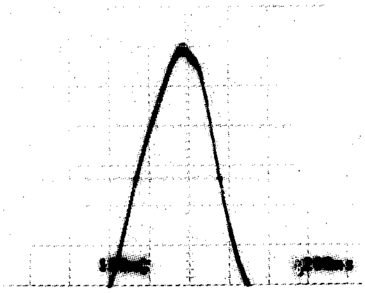
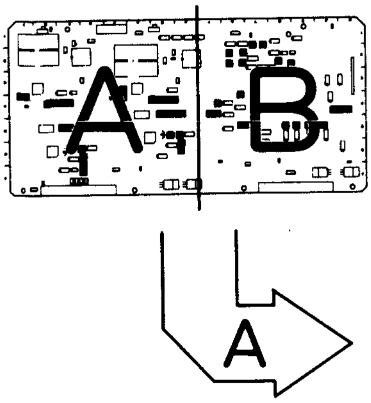
F
G
H
1
2
3
4
5
6
7
TP204
RV206

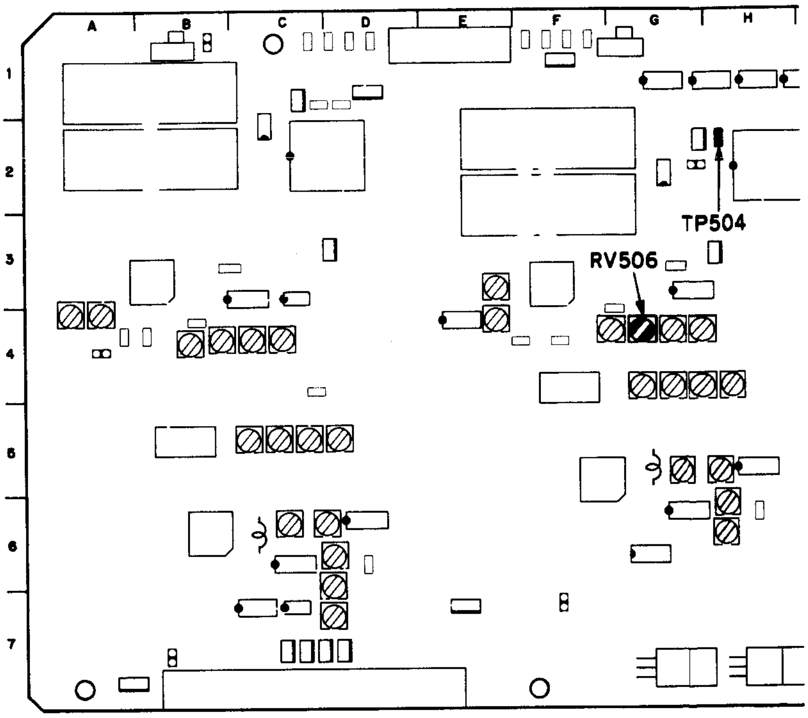
11-1-9. Y and C Demodulator Balance Adjustment (Continued)

Preparations for adjustment	Specifications	Adjustments
• Play back the pulse & bar signal portion (11:00—14:00) of the alignment tape CR5-1B PS.	TP504/VP-33 (H-2) oscilloscope  Before adjustment Minimize the moire.  ⇩ After adjustment 	(B) (C DEMOD BALANCE) ●RV506/VP-33 (G-4) TRIG: INT (−) CONNECTION 1

VP-33 board



APPLICATION : 11-1-9.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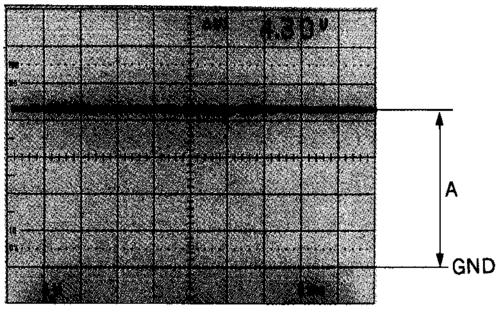
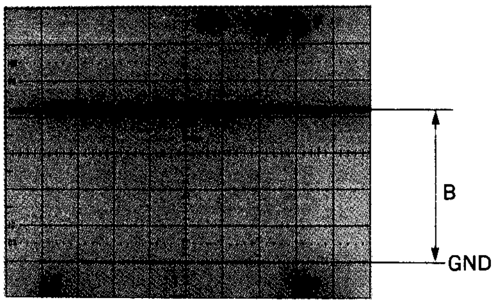
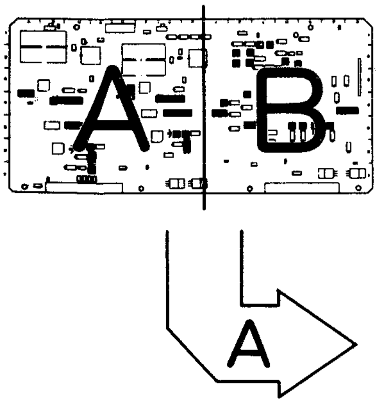
TP504
RV506

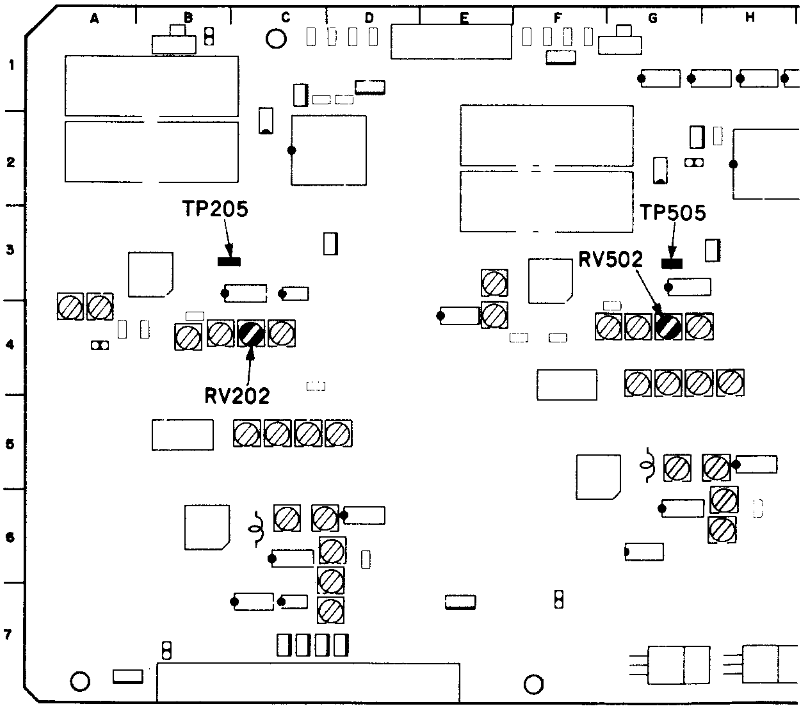
11-1-10. Y and C OMC Adjustment (Metal)

Preparations for adjustment	Specifications	Adjustments
• Insert the blank tape BCT-20M (metal) • PLAY mode	TP205/VP-33 (C-3) oscilloscope  A=4.3±0.1 V dc	(A) (Y METAL OMC) ⊘RV202/VP-33 (C-4) CONNECTION 1
	TP505/VP-33 (G-3) oscilloscope  B=4.2±0.1 V dc	(B) (C METAL OMC) ⊘RV502/VP-33 (G-4) CONNECTION 1

VP-33 board



APPLICATION : 11-1-10.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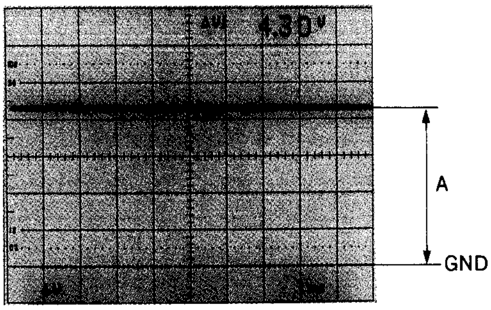
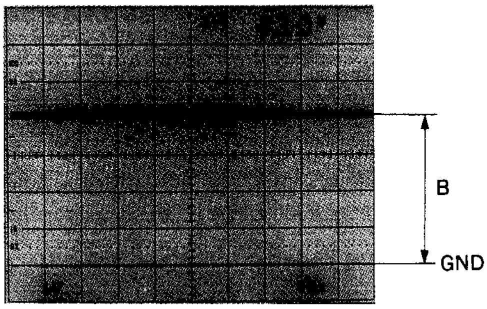
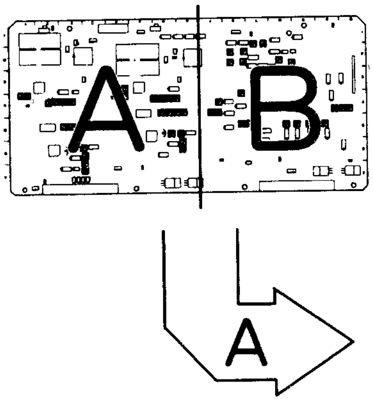
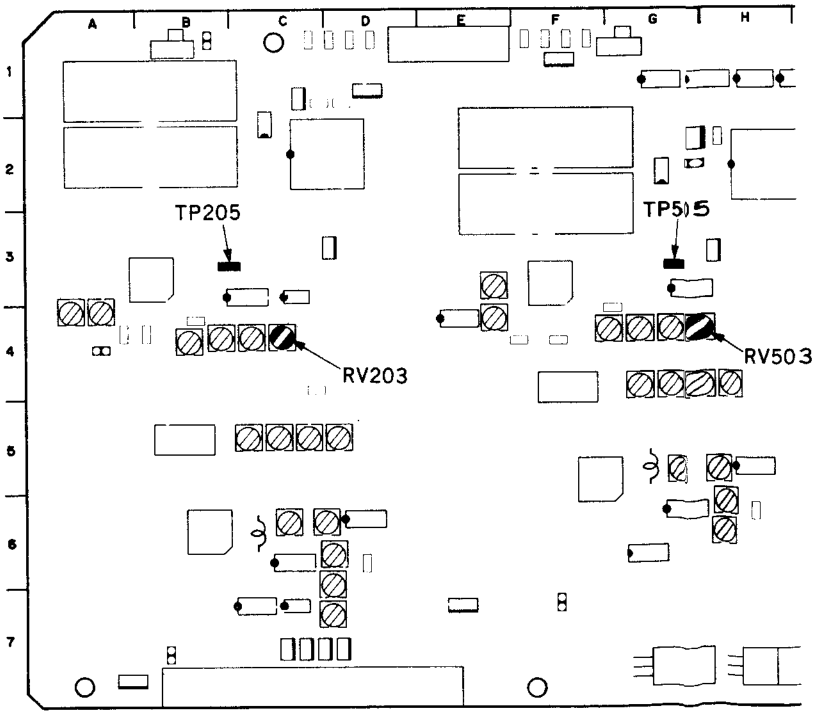
TP205
TP505
RV502
RV202

11-1-11. Y and C OMC Adjustment (Oxide)

Preparations for adjustment	Specifications	Adjustments
• Insert the blank tape BCT-20G (oxide). • PLAY mode	TP205/VP-33 (C-3) oscilloscope  A=4.3±0.1 V dc	(A) (Y OXIDE OMC) ⊘RV203/VP-33 (C-4) CONNECTION 1
	TP505/VP-33 (G-3) oscilloscope  B=4.1±0.1 V dc	(B) (C OXIDE OMC) ⊘RV503/VP-33 (G-4) CONNECTION 1

VP-33 board




A
B
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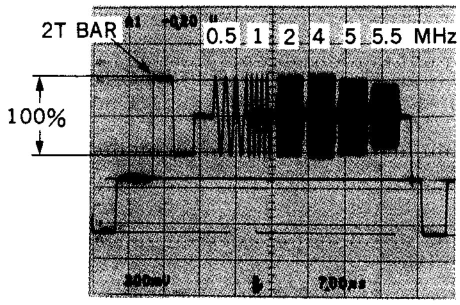
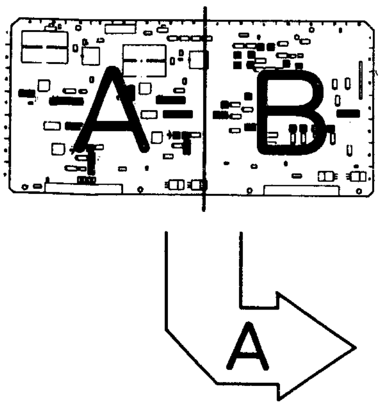
TP205
TP505
RV203
RV503

APPLICATION: 11-1-11.

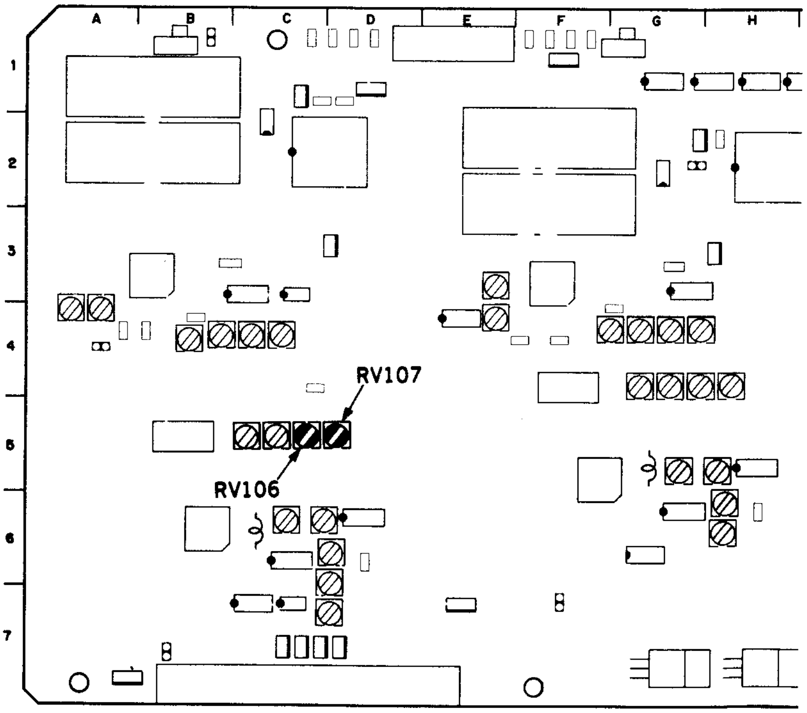
11-1-12. PB Y Frequency Response Adjustment (Metal)

Preparations for adjustment	Specifications	Adjustments
• Play back the multi burst signal portion (8:00—11:00) of the alignment tape CR5-1B PS. • Connect the waveform monitor or the oscilloscope to COMPONENT 2 OUTPUT connector (75 Ω terminated).	CONPONENT 2 Y OUT waveform monitor or oscilloscope  (1) 2T BAR reference 100% (or 0 dB) 4.0 MHz=100% (101 through 96%) ($0^{+0.1}_{-0.4}$ dB) (2) Check the levels for following frequencies. 0.5 MHz=100% (105 through 96%) (0±0.4 dB) 1.0 MHz=100% (105 through 96%) (0±0.4 dB) 2.0 MHz=100% (105 through 96%) (0±0.4 dB) 5.0 MHz= 89% (98 through 83%) ($-1.0^{+0.8}_{-0.6}$ dB) 5.5 MHz= 73% (80 through 67%) (−2.7±0.8 dB) (3) Flicker should not be on the picture monitor.	CH-A: ⊘RV106/VP-33 (C-5) CH-B: ⊘RV107/VP-33 (D-5) TRIG: REF. VIDEO CONNECTION 1

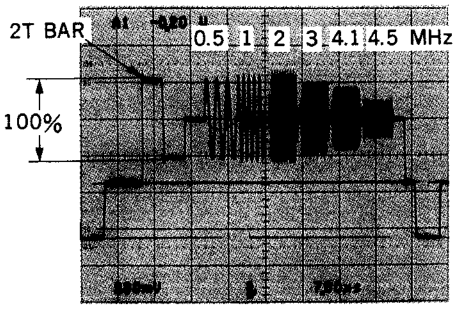
VP-33 board



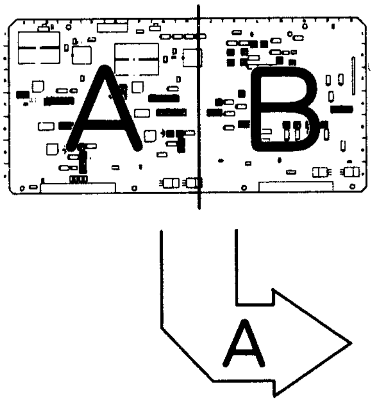
APPLICATION: 11-1-12.



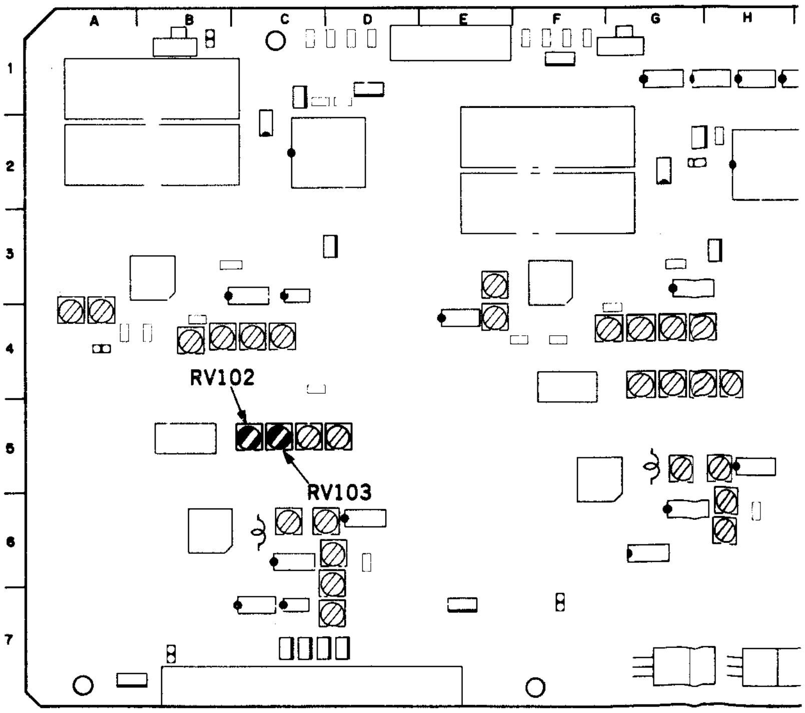
11-1-13. PB Y Frequency Response Adjustment (Oxide)

Preparations for adjustment	Specifications	Adjustments
• Play back the multi burst signal portion (3:00 — 6:00) of the alignment tape CR5-2A PS. • Connect the waveform monitor or the oscilloscope to COMPONENT 2 OUTPUT connector (75 Ω terminated).	COMPONENT 2 Y OUT waveform monitor or oscilloscope  (1) 2T BAR reference 100% (or 0 dB) 3.0 MHz= 89% (94 through 84%) (−1.0±0.5 dB) (2) Check the levels for following frequencies. 0.5 MHz=100% (105 through 96%) (0±0.4 dB) 1.0 MHz=100% (105 through 96%) (0±0.4 dB) 2.0 MHz=100% (105 through 96%) (0±0.4 dB) 4.1 MHz= 71% (87 through 56%) ($-3.0^{+1.8}_{-2.0}$ dB) (3) Flicker should not be on the picture monitor.	CH-A: ⊘RV102/VP-33 (C-5) CH-B: ⊘RV103/VP-33 (C-5) TRIG: REF VIDEO CONNECTION 1

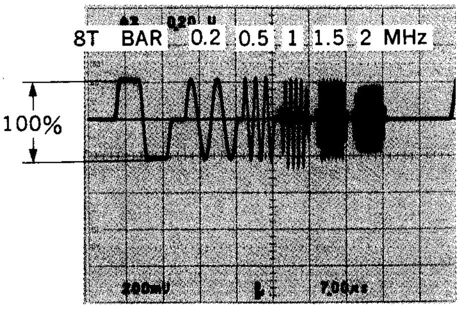
VP-33 board



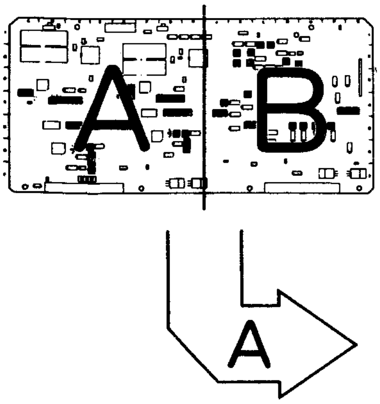
APPLICATION : 11-1-13.



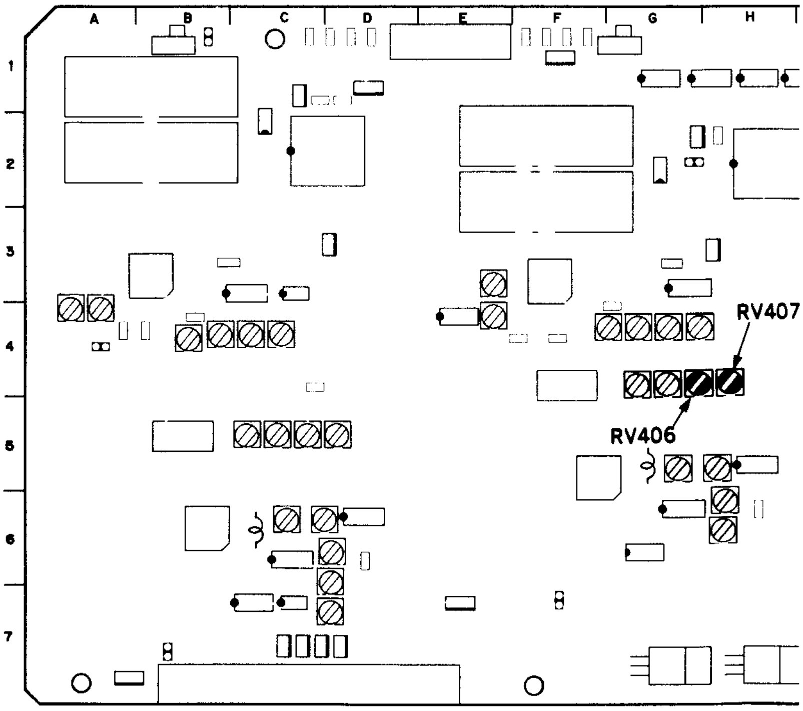
11-1-14. PB C Frequency Response Adjustment (Metal)

Preparations for adjustment	Specifications	Adjustments
• Play back the multi burst signal portion (8:00—11:00) of the alignment tape CR5-1B PS. • Connect the waveform monitor or the oscilloscope to COMPONENT 2 OUTPUT connector (75 Ω terminated).	COMPONENT 2 R—Y OUT/B—Y OUT waveform monitor or oscilloscope  (1) R—Y 8T BAR reference 100% (or 0 dB) 1.5 MHz= 94% (98 through 91%) (−0.5±0.3 dB) (2) Check the levels for following frequencies. 0.2 MHz=100% (105 through 96%) (0±0.4 dB) 0.5 MHz=100% (105 through 96%) (0±0.4 dB) 1.0 MHz=100% (105 through 96%) (0±0.4 dB) 2.0 MHz= 81% (91 through 72%) (−1.8±1.0 dB) (3) Check that the waveform of B−Y satisfies the specifications above. If it does not, perform fine adjustments so that both waveforms of R−Y and B−Y satisfy the specifications.	CH-A : ⊘RV406/VP-33 (G-4) CH-B : ⊘RV407/VP-33 (H-4) TRIG: REF. VIDEO CONNECTION 1

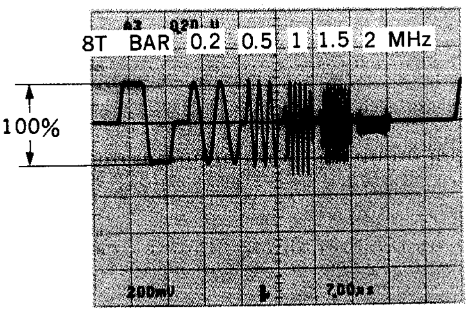
VP-33 board



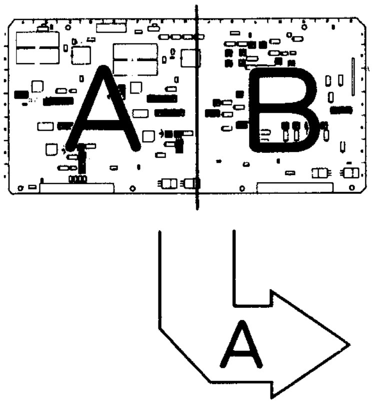
APPLICATION : 11-1-14.



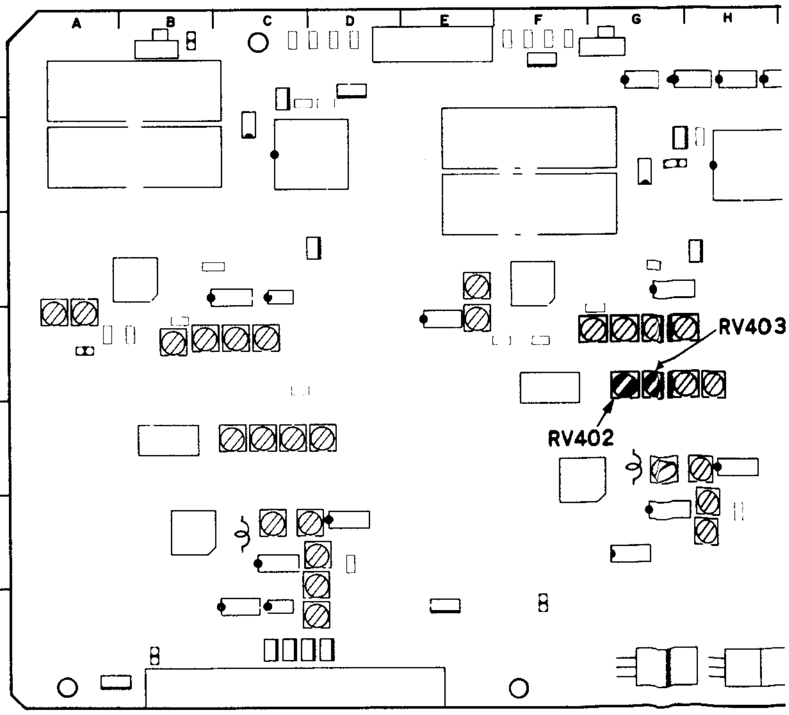
11-1-15. PB C Frequency Response Adjustment (Oxide)

Preparations for adjustment	Specifications	Adjustments
• Play back the multi burst signal portion (3:00—6:00) of the alignment tape CR5-2A PS. • Connect the waveform monitor or the oscilloscope to COMPONENT 2 OUTPUT connector (75 Ω terminated).	COMPONENT 2 R—Y OUT/B—Y OUT waveform monitor or oscilloscope  (1) R—Y. 8T BAR reference 100% (or 0dB) 1.0 MHz= 94% (98 through 91%) (−0.5±0.3 dB) (2) Check the levels for following frequencies. 0.2 MHz=100% (105 through 96%) (0±0.4 dB) 0.5 MHz=100% (105 through 96%) (0±0.4 dB) 1.5 MHz= 84% (97 through 73%) (−1.5±1.2 dB) (3) Check that the waveform of B—Y satisfies the specifications above. If it does not, perform fine adjustments so that both waveforms of R—Y and B—Y meet the specifications.	CH-A: ⊘RV402/VP-33 (G-4) CH-B: ⊘RV403/VP-33 (G-4) TRIG: REF. VIDEO CONNECTION 1

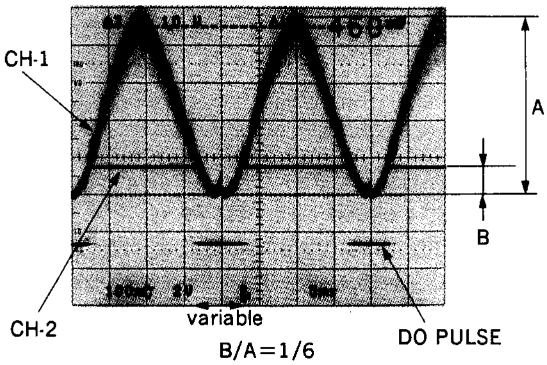
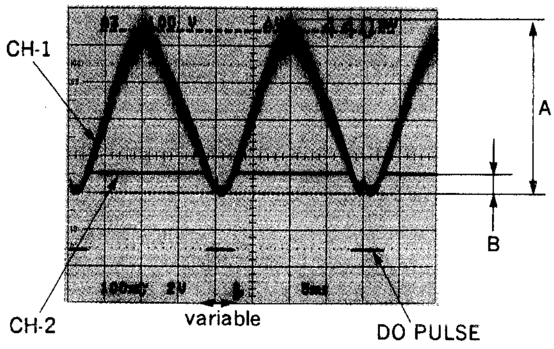
VP-33 board



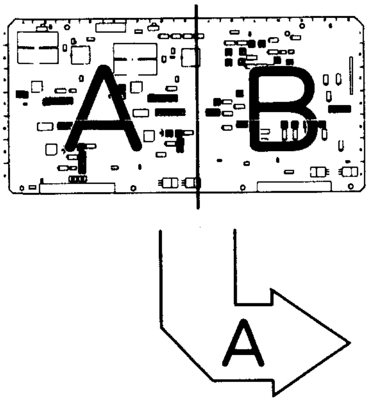
APPLICATION: 11-1-15.



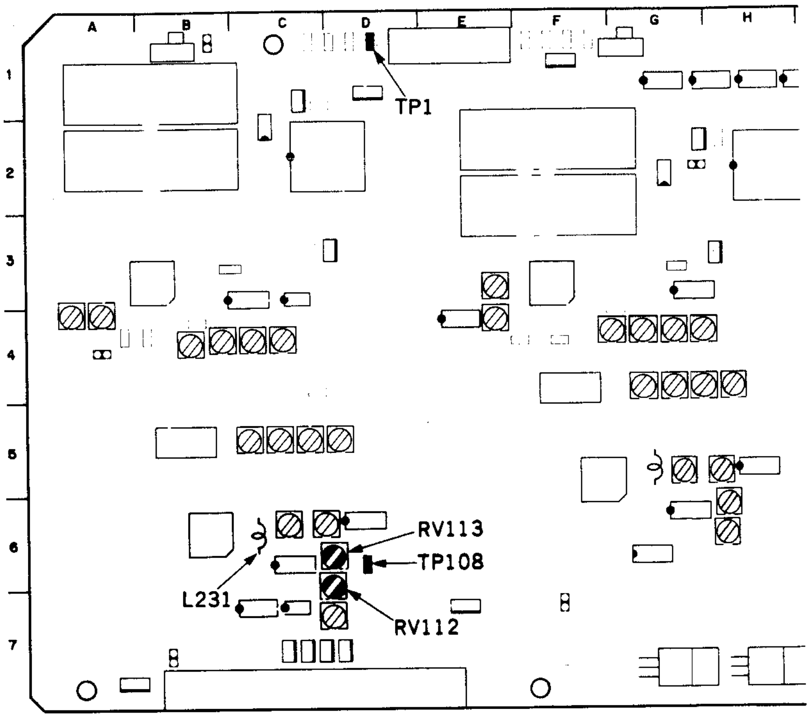
11-1-16. Y DOC Sensitivity Adjustment

Preparations for adjustment	Specifications	Adjustments
• S2-1, 2, 5/DT-30 (B-1) : ON Step 1 • Play back the color bars signal portion (0:00 — 3:00) of the alignment tape CR5-2A PS in JOG (STILL) mode.	CH-1 : L231 (lower terminal)/VP-33 (C-6) (AC measurement mode) CH-2 : TP108 (Y DO PLS)/VP-33 (D-6) oscilloscope Set the bottom of CH-1 waveform to trigger position. (Then, noises on picture monitor are equal.) In this condition, adjust DO detective level B to meet the specifications.  B/A=1/6	(Y OXIDE DO) ⊘RV113/VP-33 (D-6) TRIG: TP1(Y SW)/VP-33(D-1) CONNECTION 1
Step 2 • Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS in JOG (STILL) mode. • After adjustment, set S2-1, 2, 5/DT-30 (B-1) to OFF.	oscilloscope  B/A=1/8	(Y METAL DO) ⊘RV112/VP-33 (D-6) TRIG: TP1 (Y SW)/VP-33 (D-1) CONNECTION 1
Step 3 • Play back the dropout signal portion (26:00—28:00) of the alignment tape CR5-1B PS.	Check that the dropout portion on the picture monitor is corrected.	(Check) CONNECTION 1

VP-33 board



APPLICATION : 11-1-16.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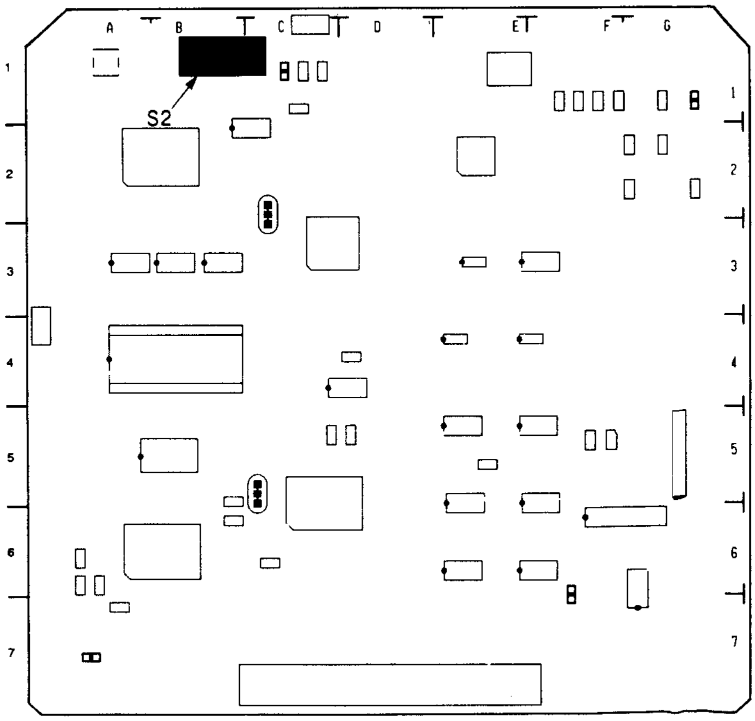
TP1
RV113
TP108
L231
RV112

DT-30 board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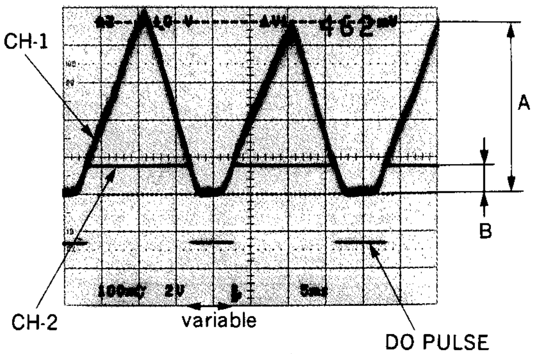
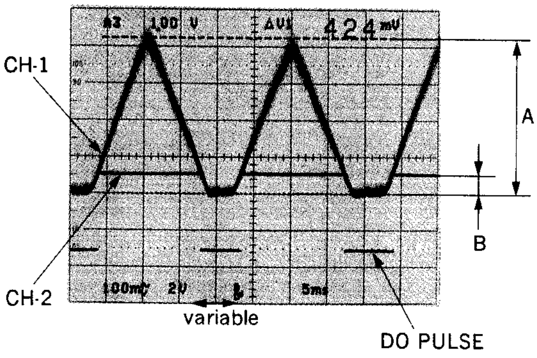
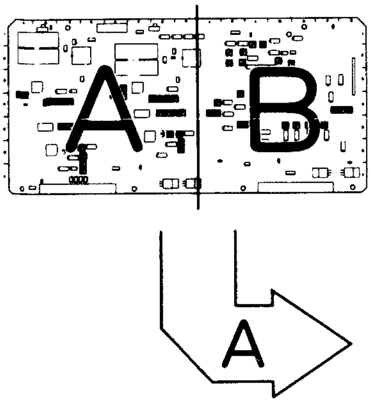
S2

APPLICATION : 11-1-16.

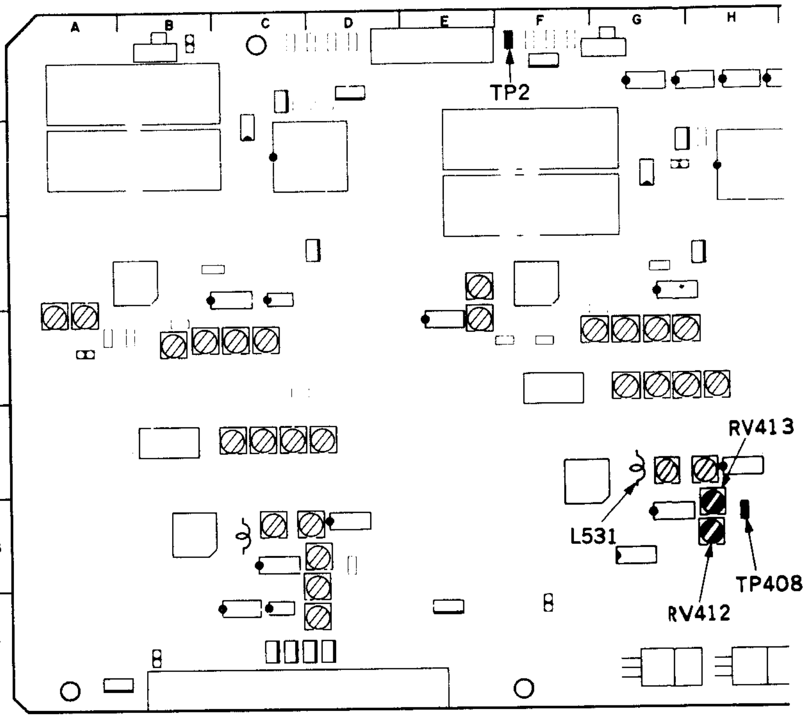
11-1-17. C DOC Sensitivity Adjustment

Preparations for adjustment	Specifications	Adjustments
• S2-1, 2, 5/DT-30 (D-1): ON Step 1 • Play back the color bars signal portion (0:00—3:00) of the alignment tape CR5-2A PS in JOG (STILL) mode.	CH-1: L531 (lower terminal)/VP-33 (G-5) (AC measurement mode) CH-2: TP408 (C DO PLS)/VP-33 (H-6) oscilloscope Set the bottom of CH-1 waveform to trigger position. (Then, noises on picture monitor are equal.) In this condition, adjust DO detective level B to meet the specifications.  B/A=1/6	(C OXIDE DO) ⊘RV413/VP-33 (H-6) TRIG: TP2 (C SW)/VP-33 (F-1) CONNECTION 1
Step 2 • Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS in JOG (STILL) mode. • After adjustment, set S2-1, 2, 5/DT-30 (B-1) to OFF.	oscilloscope  B/A=1/8	(C METAL DO) ⊘RV412/VP-33 (H-6) TRIG: TP2 (C SW)/VP-33 (F-1) CONNECTION 1
Step 3 • Play back the dropout signal portion (26:00—28:00) of the alignment tape CR5-1B PS.	Check that the dropout portion on the picture monitor is corrected.	(Check) CONNECTION 1

VP-33 board



APPLICATION : 11-1-17.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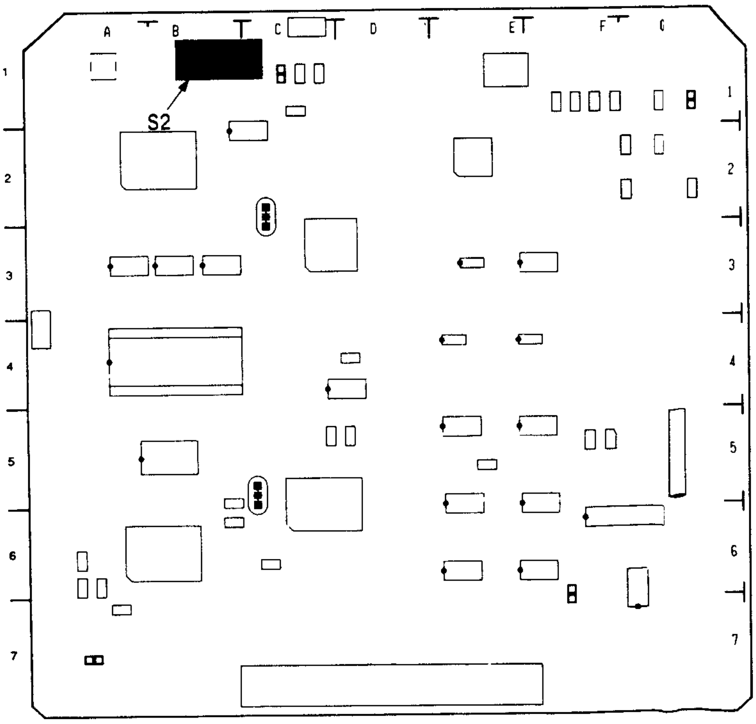
TP2
RV413
L531
TP408
RV412

DT-30 board

APPLICATION : 11-1-17.


A
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G
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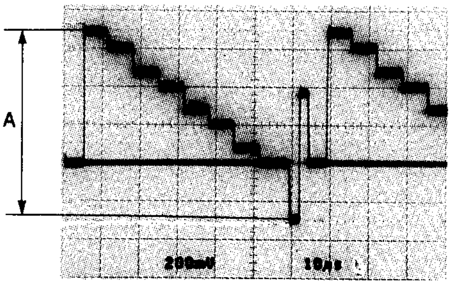
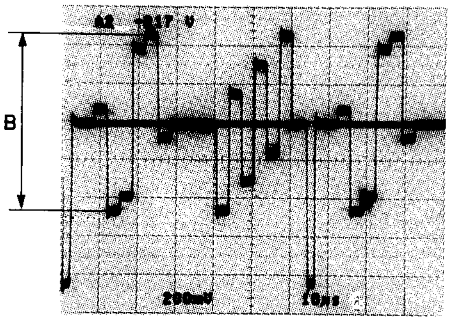
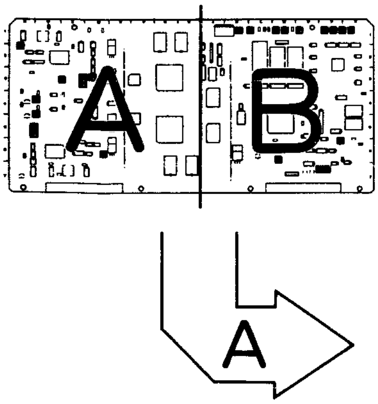
6
7
S2

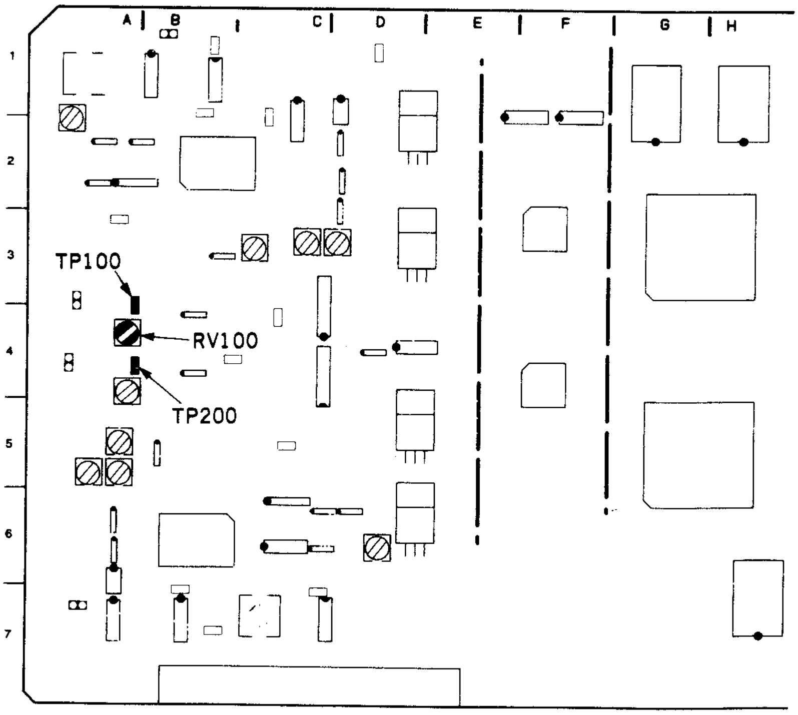
11-2. TBC BOARD ADJUSTMENT

11-2-1. Y and C TBC Input Level Check

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS.	TP100/TBC-18 (A-4) oscilloscope  A=1.0±0.1 V p-p	(A) (Y IN Check) TRIG: INT (−) CONNECTION 1
	TP200/TBC-18 (A-4) oscilloscope  B=0.933±0.1 V p-p	(B) (C IN Check) TRIG: INT (−) CONNECTION 1

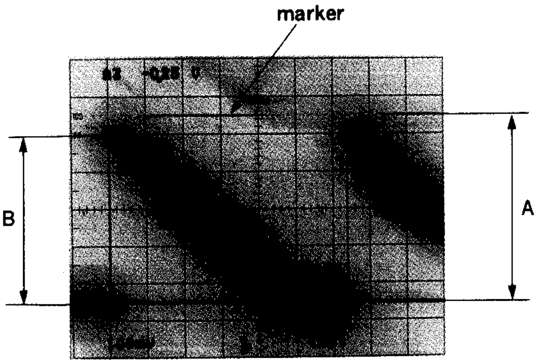
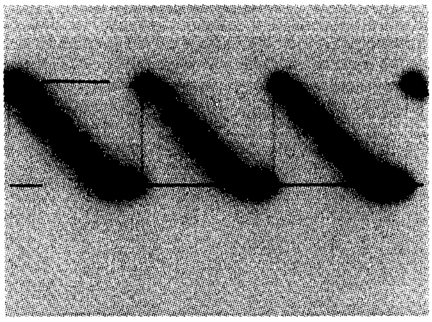
TBC-18 board



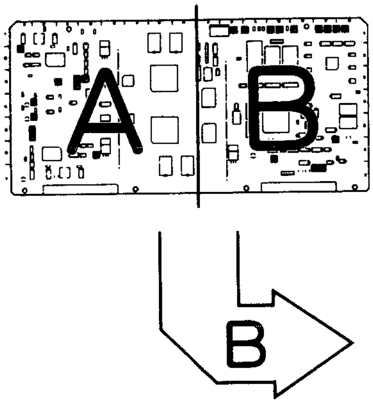


APPLICATION : 11-2-1.
11-2-2.

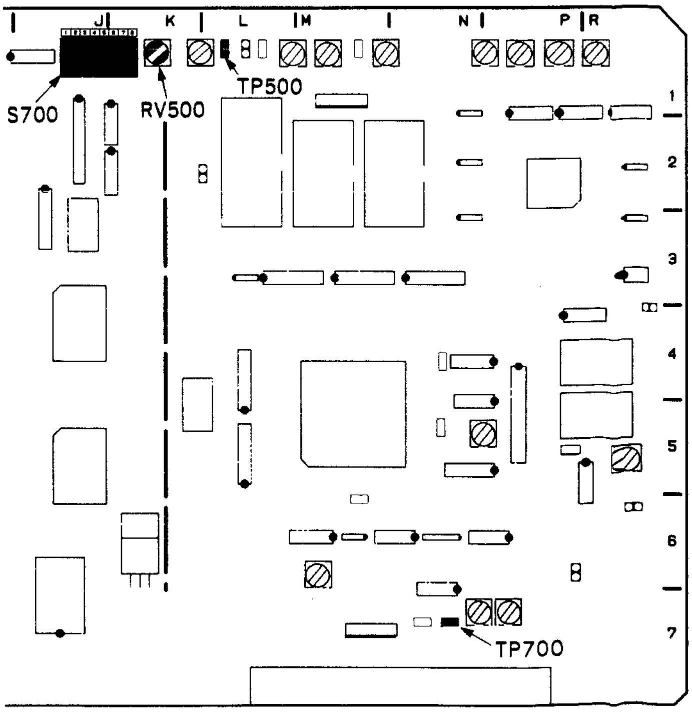
11-2-2. Y TBC Output Level and Gain Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Set S700-1 (LEVEL REF) (J-1) on the TBC-18 board to ON. **NOTE**: Bright the oscilloscope, otherwise the marker of the reference level may be missed. • After adjustment is completed, set S700-1/TBC-18 to OFF.	TP500 (Y OUT)/TBC-18 (L-1) oscilloscope **Before adjustment**  ⇩ **After adjustment**  A=500±10 mV p-p B=500±10 mV p-p	(A) (VIDEO LEVEL) ⊘RV500/TBC-18 (K-1) (B) (Y GAIN) ⊘RV100/TBC-18 (A-4) TRIG: TP700/TBC-18 (N-7) CONNECTION 1

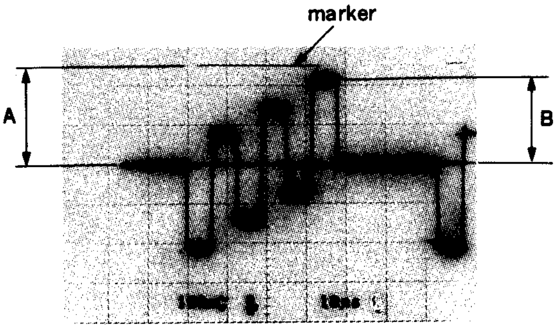
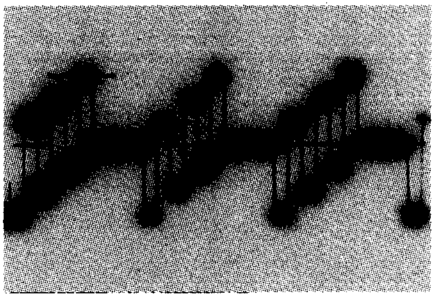
TBC-18 board



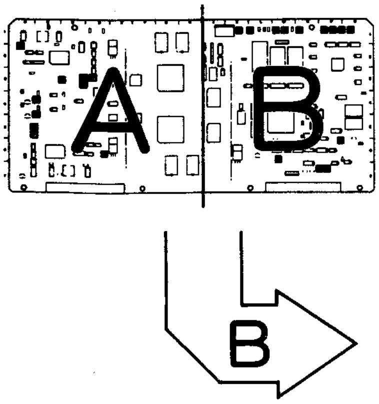
APPLICATION : 11-2-2.



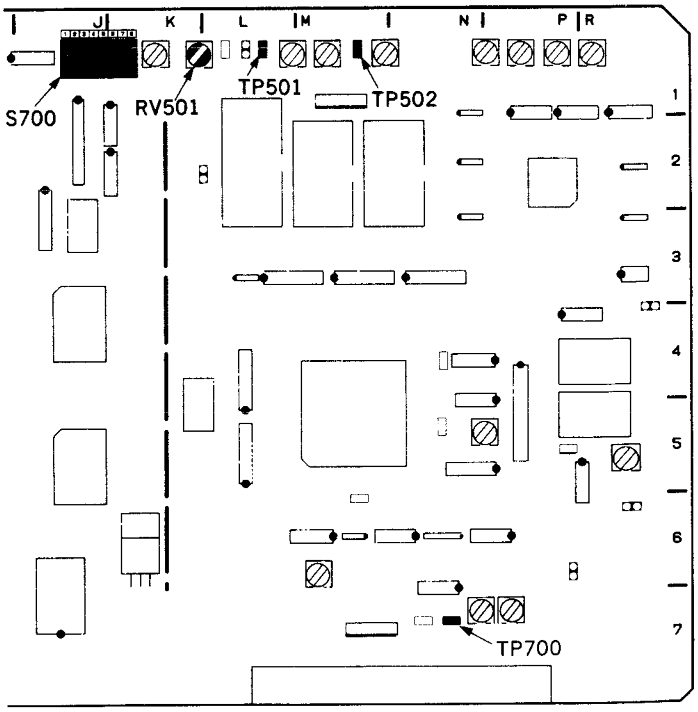
11-2-3. C TBC Output Level and Gain Adjustment

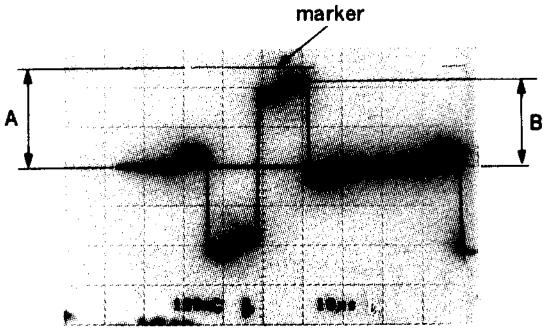
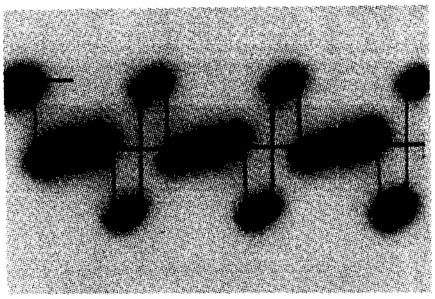
Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Set S700-1 (LEVEL REF) (J-1) on the TBC-18 board to ON. **NOTE:** Bright the oscilloscope, otherwise the marker of the reference level may be missed.	TP501 (B−Y OUT)/TBC-18 (L-1) oscilloscope **Before adjustment**  ⇩ **After adjustment**  A=333±10 mV p-p B=333±10 mV p-p	(A) (CHROMA LEVEL) ⊘RV501/TBC-18 (L-1) (B) (C GAIN) ⊘RV200/TBC-18 (A-4) TRIG: TP700/TBC-18 (N-7) CONNECTION 1

TBC-18 board

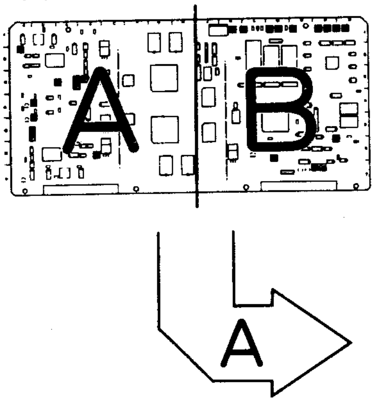


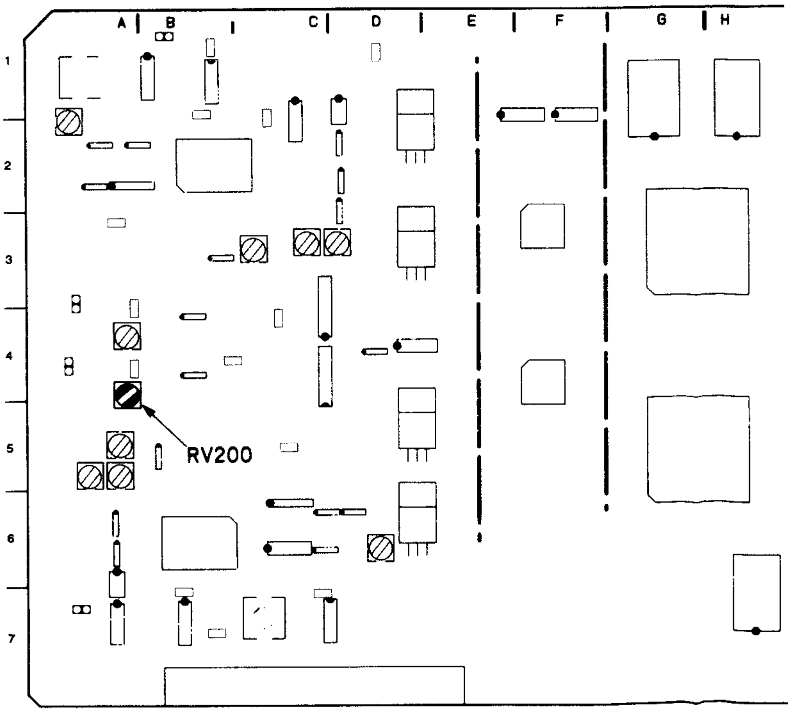
APPLICATION: 11-2-3.



Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Set S700-1 (LEVEL REF)(J-1) on the TBC-18 board to ON. **NOTE:** Bright the oscilloscope, otherwise the marker of the reference level may be missed. • After adjustment is completed, set S700-1/TBC-18 to OFF.	TP502 (R—Y OUT)/TBC-18 (M-1) oscilloscope **Before adjustment**  ⇩ **After adjustment**  A=333±10 mV p-p B=333±20 mV p-p	(Check) TRIG: TP700/TBC-18 (N-7) CONNECTION 1

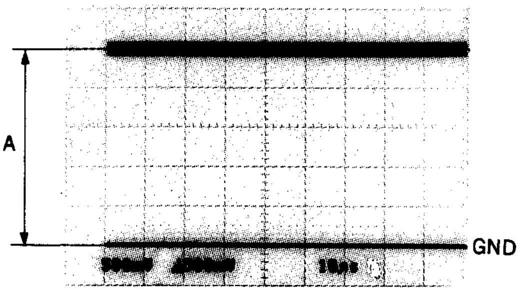
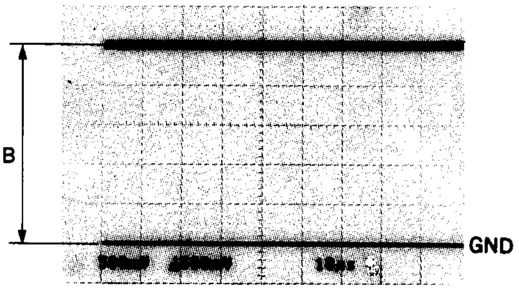
TBC-18 board



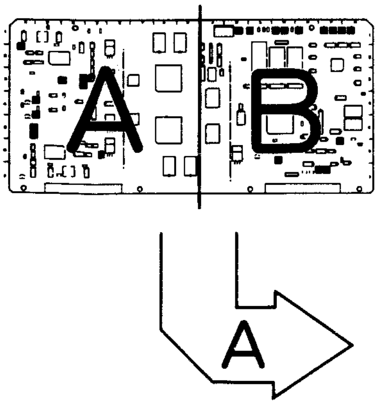


APPLICATION: 11-2-3.

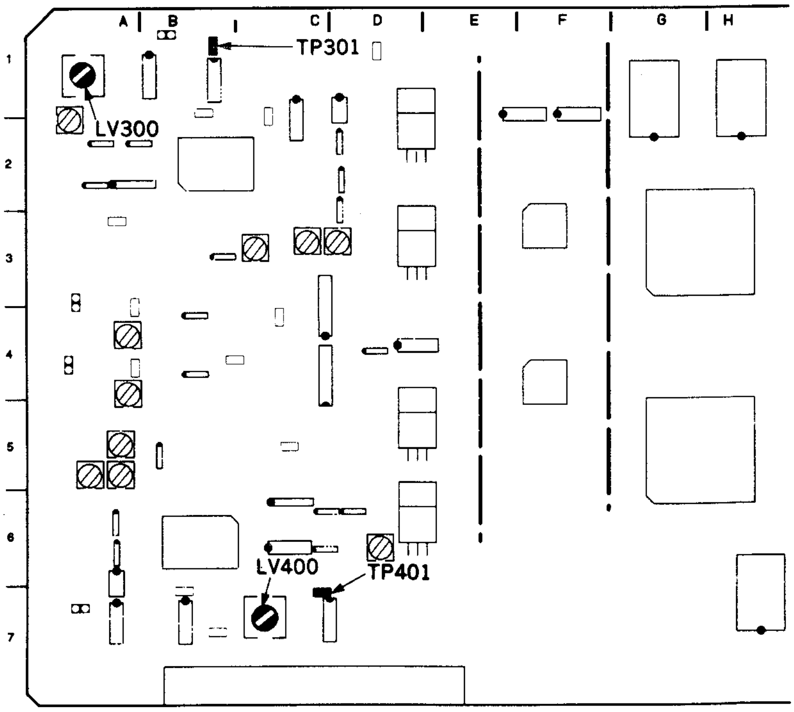
11-2-4. Y and C Normal VCO Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion of (14:00—17:00) the alignment tape CR5-1B PS.	TP301/TBC-18 (B-1) oscilloscope  A=2.50±0.05 V dc	(A) (Y ERR VOLT) ⊘LV300/TBC-18 (A-1) CONNECTION 1
	TP401/TBC-18 (C-7) oscilloscope  B=2.50±0.05 V dc	(B) (C ERR VOLT) ⊘LV400/TBC-18 (C-7) CONNECTION 1

TBC-18 board

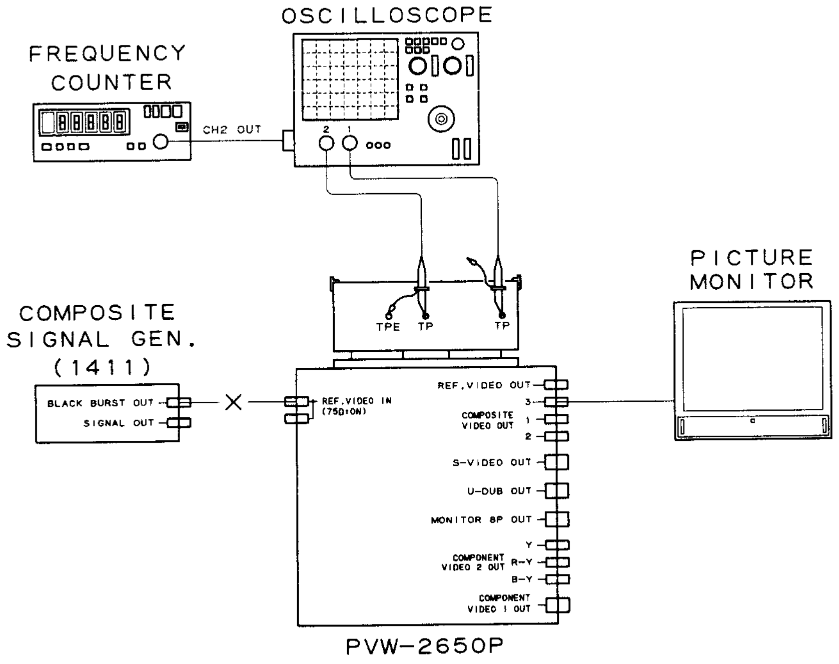


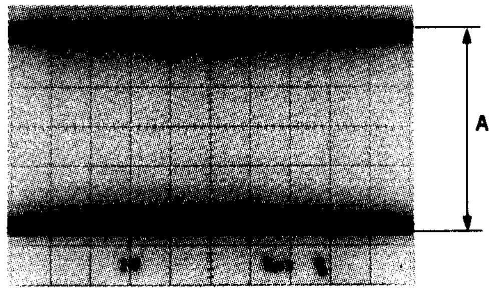
APPLICATION : 11-2-4.


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
TP301
LV300
LV400
TP401

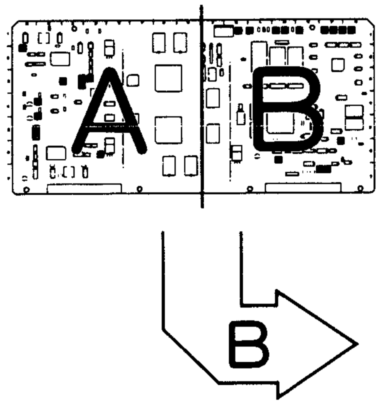
11-2-5. INT SC Frequency Adjustment

[CONNECTION]

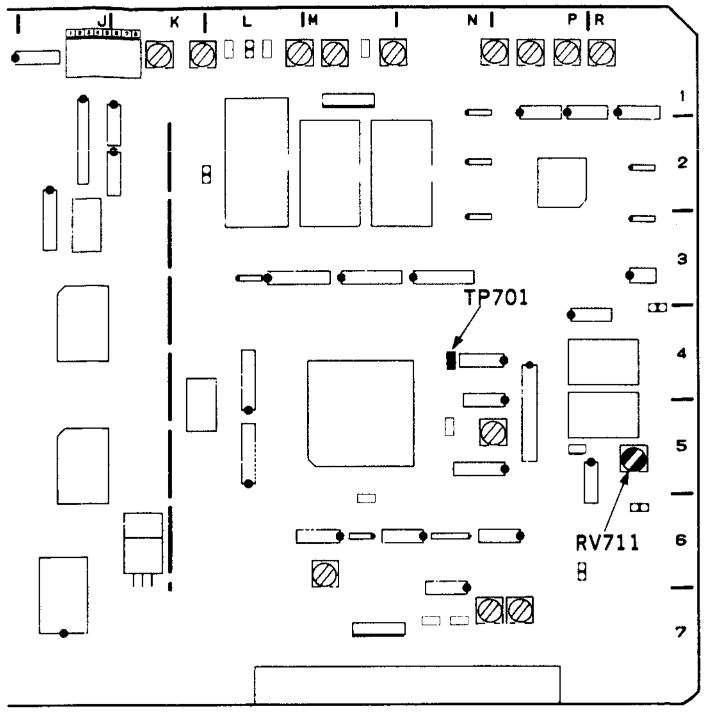

FREQUENCY COUNTER
OSCILLOSCOPE
CH2 OUT
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
TPE
TP
TP
PICTURE MONITOR
REF. VIDEO IN (75Ω ON)
REF. VIDEO OUT
COMPOSITE VIDEO OUT 1 2 3
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
COMPONENT VIDEO 2 OUT Y R-Y B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect the frequency counter to the OUTPUT terminal of oscilloscope. • Disconnect the REF VIDEO INPUT connector.	TP701/TBC-18 (N-4) oscilloscope  $A = 5.0^{+0.2}_{-0.5}$ V p-p	(Check) TRIG: INT
• After adjustment is completed, connect the REF VIDEO INPUT connector.	TP701/TBC-18 (N-4) Frequency counter f=4,433,618±10 Hz	(4FSC FREQ) ●RV711/TBC-18 (R-5)

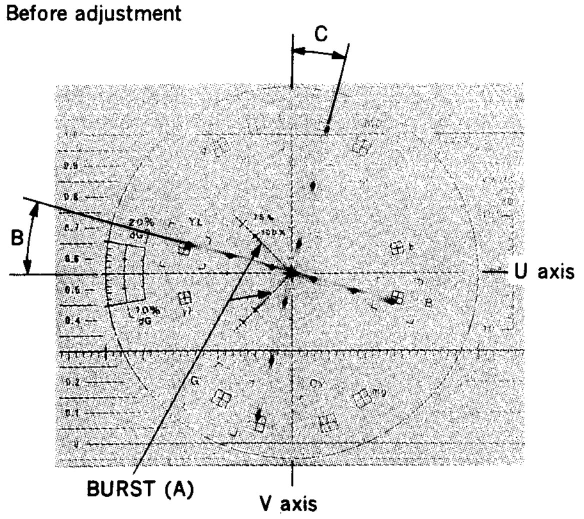
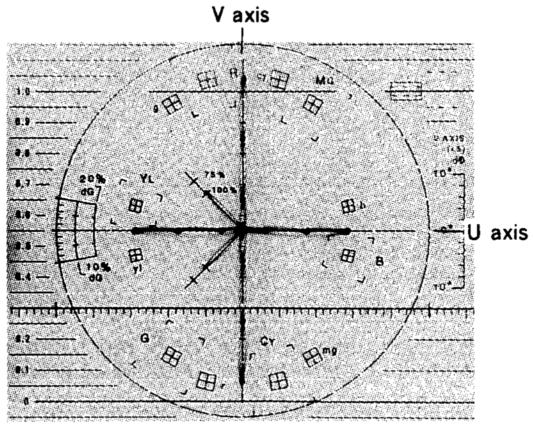
TBC-18 board



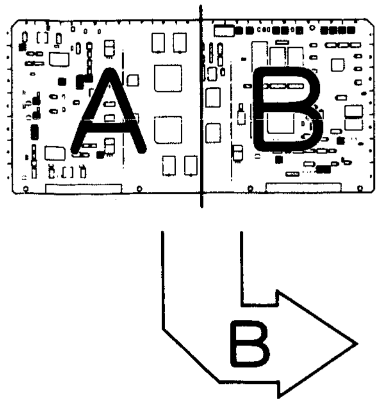
APPLICATION: 11-2-5.


J
K
L
M
N
P
R
1
2
3
4
5
6
7
TP701
RV711

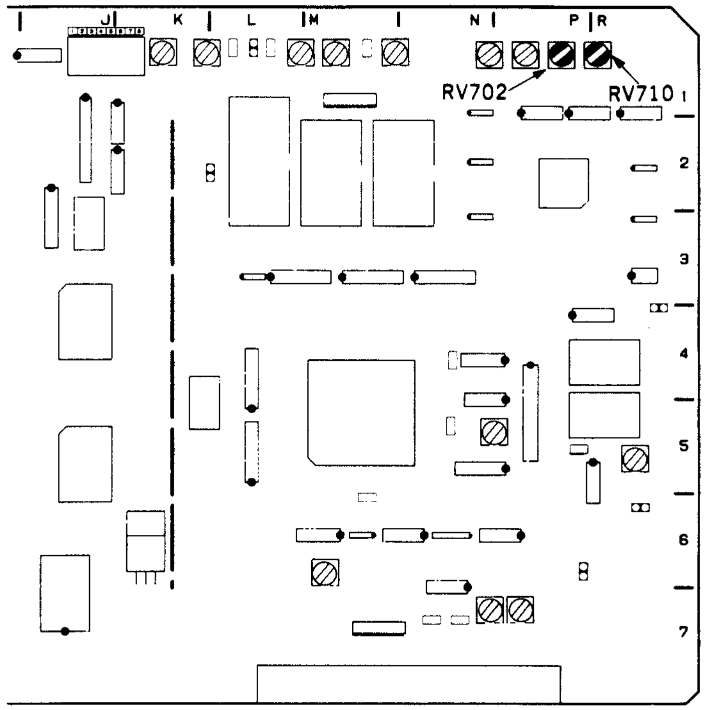
11-2-6. U—V Axis Phase (B-Y, R-Y Phase) Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the Quad Phase signal portion (22:00—24:00) of the alignment tape CR5-1B PS. • Connect the vectorscope to VIDEO OUT 1 connector.	VIDEO OUT 1 vectorscope Before adjustment  After adjustment  (A) Set the dot of the burst on the right position on the scale. (B) Set the dots of the B—Y on the U axis of the vector scope. B=0±1° (C) Set the dots of the R—Y on the V axis of the vector scope. C=0±1°	(A) Burst PHASE control/vectorscope (B) U axis (HUE) ●RV710/TBC-18 (R-1) (C) V axis (U/V OFFSET) ●RV702/TBC-18 (P-1) TRIG: REF. VIDEO CONNECTION 2

TBC-18 board



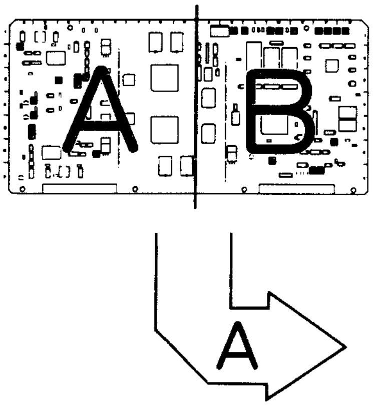
APPLICATION : 11-2-6.



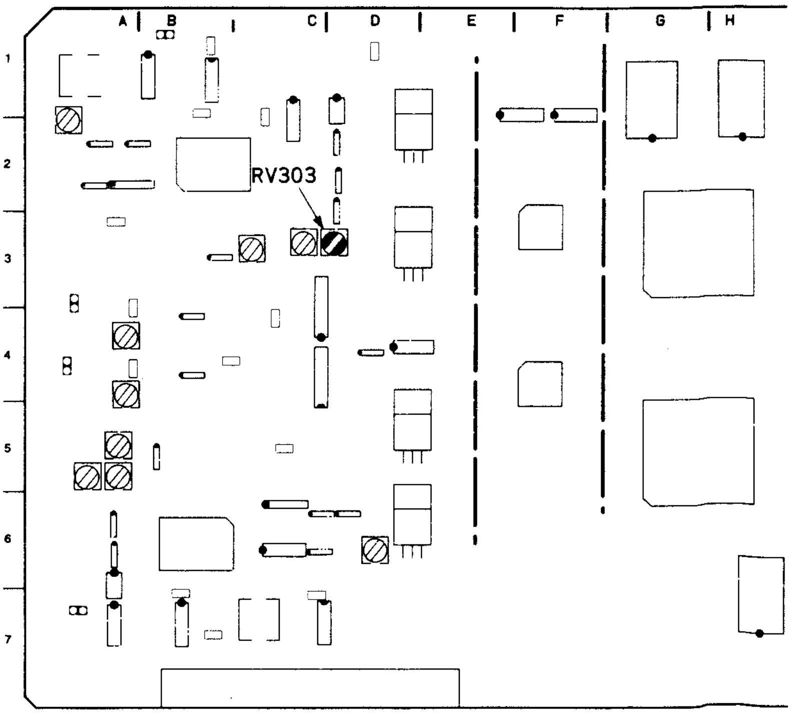
11-2-7. TBC Tracking Adjustment

Preparations for adjustment	Specifications	Adjustments
Step 1	• Fully turn RV303 counterclockwise.	(Y TR GAIN) ⊘RV303/TBC-18 (D-3)
Step 2 • Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Shuttle mode (24 times normal speed in forward and reverse)	picture monitor • The picture of 24 times normal speed appears. • If the picture does not appear, turn RV303 clockwise gradually so that the picture appear.	(Tracking check)

TBC-18 board

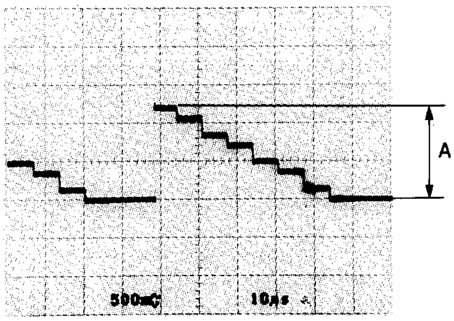


APPLICATION : 11-2-7.

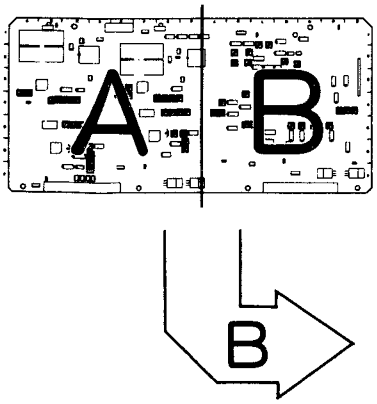


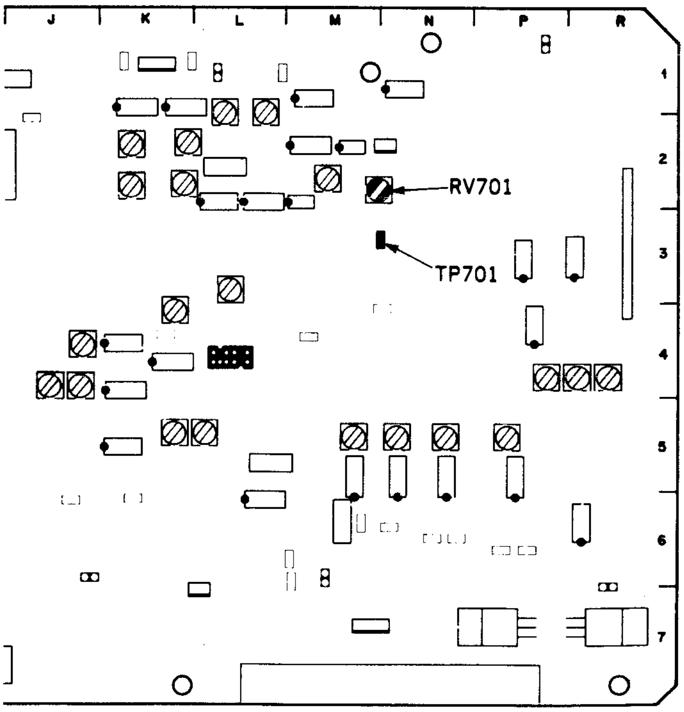
11-3. VP BOARD (VO, EN SYSTEM) ADJUSTMENT

11-3-1. ENC Y Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS.	TP701/VP-33 (N-3) oscilloscope  A=1.20±0.02 V p-p	⊘RV701/VP-33 (M-2) TRIG: REF VIDEO CONNECTION 1

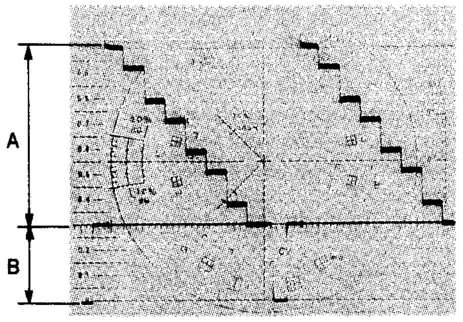
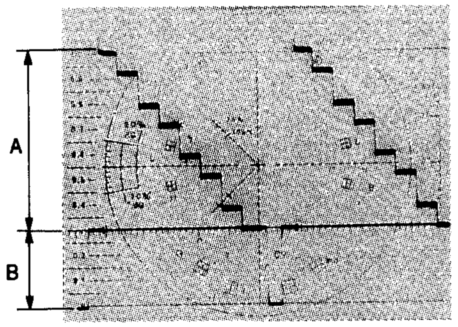
VP-33 board



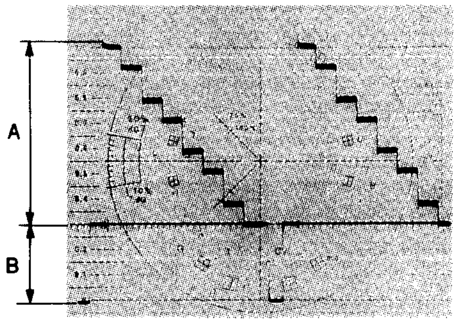


APPLICATION : 11-3-1.

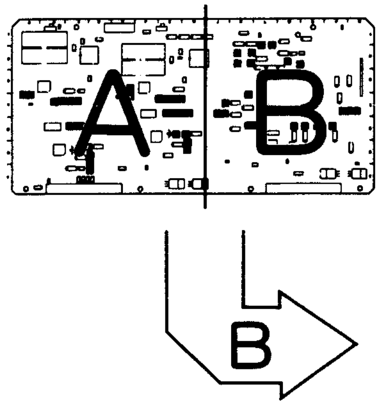
11-3-2. COMPONENT 2 and 1 Y OUT Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. Step 1 • Connect the waveform monitor to COMPONENT 2 Y OUTPUT connector.	COMPONENT 2 Y OUT waveform monitor  A=700.0±3.5 mV p-p B=300.0±1.5 mV p-p	(A) (Y) ⊘RV703/VP-33 (M-5) (B) (Y SYNC) ⊘RV708/VP-33 (P-4) TRIG: REF. VIDEO CONNECTION 1
Step 2 • Connect the waveform monitor to the Y terminal (1-2 (G)) of COMPONENT 1 OUTPUT connector. (using a multi connector cable DOBNC.)	COMPONENT 1 (Y) OUT waveform monitor  A=700±7 mV p-p B=300±3 mV p-p	(Check) TRIG: REF. VIDEO CONNECTION 1

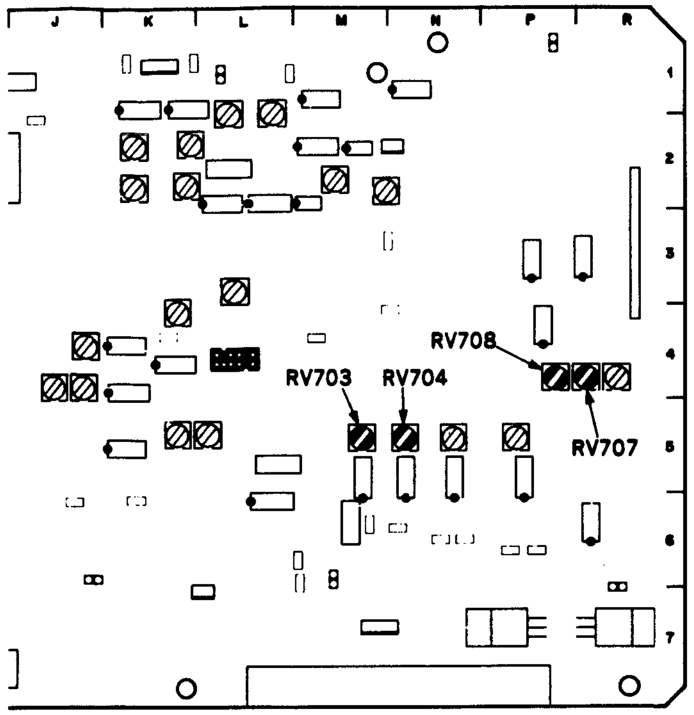
11-3-3. S-VIDEO OUT Y Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect the waveform monitor to the Y terminal (3-1 (G)) of S-VIDEO OUTPUT connector.	S-VIDEO (Y) OUT waveform monitor  A=700±7 mV p-p B=300±3 mV p-p	(A) (S/Y) ⊘RV704/VP-33 (N-5) (B) (S VIDEO SYNC) ⊘RV707/VP-33 (R-4) TRIG: REF. VIDEO CONNECTION 1

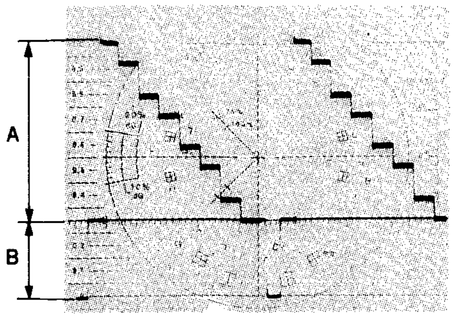
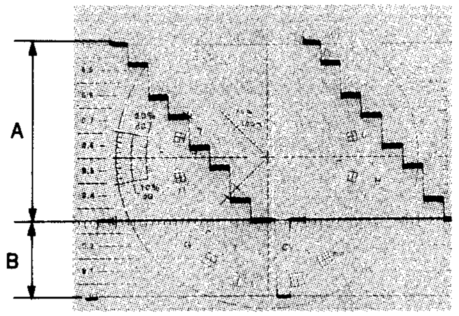
VP-33 board



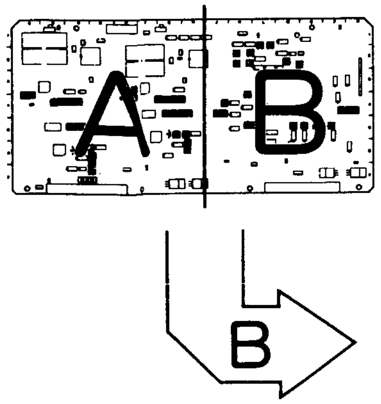
APPLICATION : 11-3-2.
11-3-3.

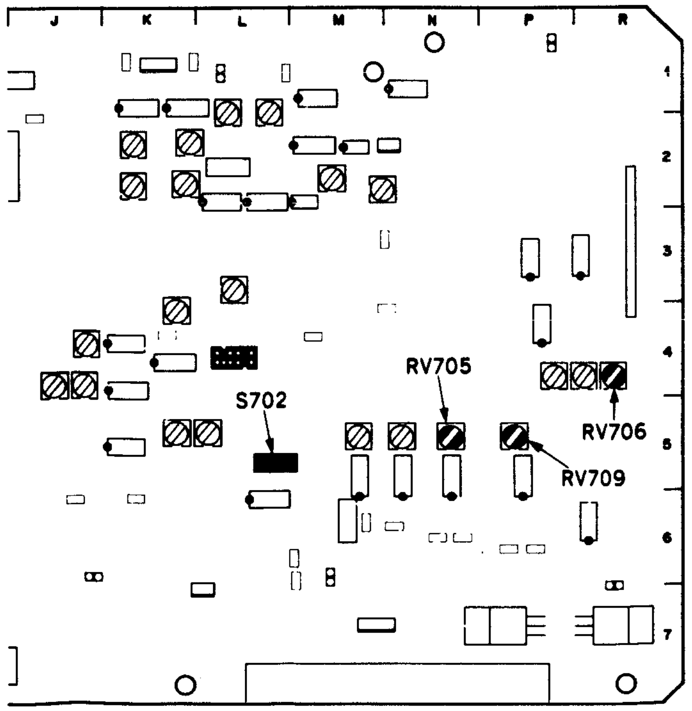


11-3-4. VIDEO OUT 1 and 2 Y Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Set S702 (CHROMA) (L-5) on the VP-33 board to OFF. Step 1 • Connect the waveform monitor to VIDEO OUT 1 connector.	VIDEO OUT 1 waveform monitor  A=700.0±3.5 mV p-p B=300.0±1.5 mV p-p	(A) (VIDEO) ⊘RV705/VP-33 (N-5) (B) (VIDEO SYNC) ⊘RV706/VP-33 (R-4) TRIG: REF. VIDEO CONNECTION 2
Step 2 • Connect the waveform monitor to VIDEO OUT 2 connector. • After adjustment is completed, set S702/VP-33 to ON.	VIDEO OUT 2 waveform monitor  A=700±7 mV p-p B=300±3 mV p-p	(Check) TRIG: REF. VIDEO CONNECTION 2

VP-33 board

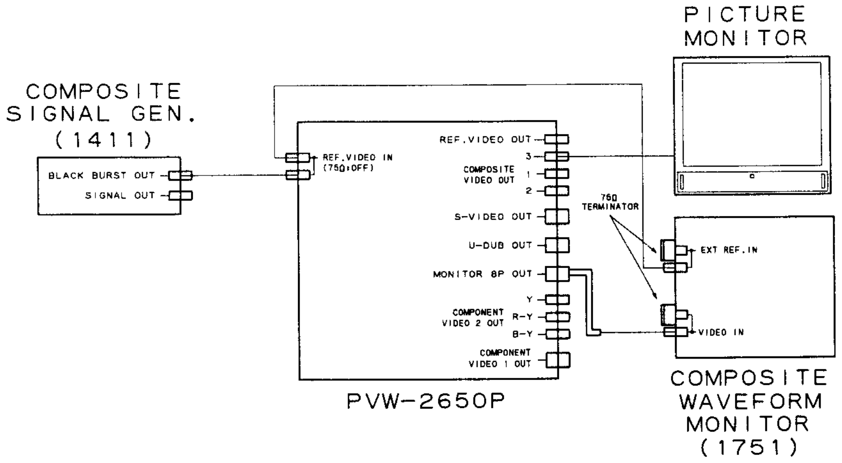


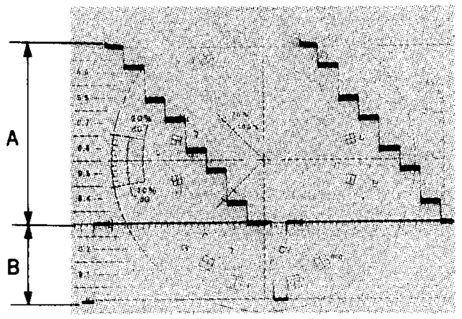
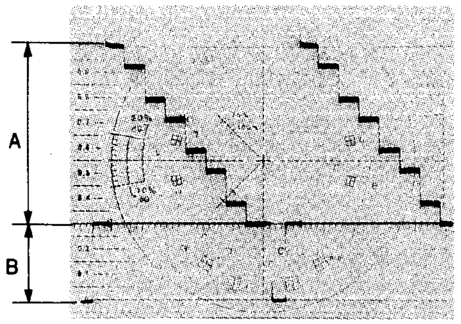

J
K
L
M
N
P
R
1
2
3
4
5
6
7
RV705
S702
RV706
RV709

APPLICATION : 11-3-4.
11-3-5.

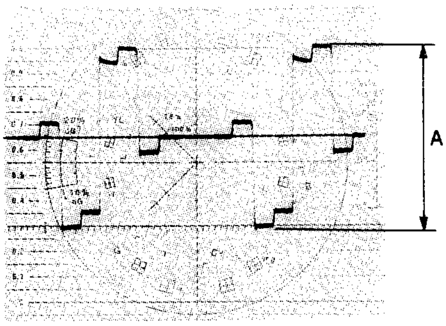
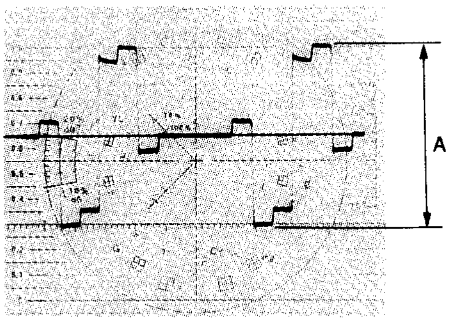
11-3-5. VIDEO OUT 3 and MONITOR OUT Y Level Adjustment

[CONNECTION]

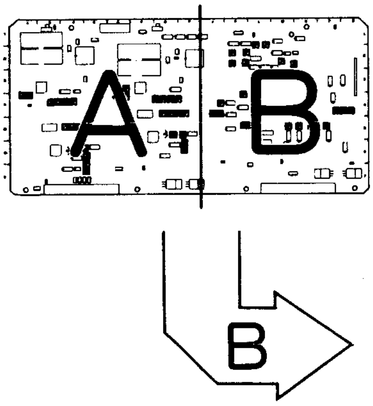

PICTURE MONITOR
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
75Ω TERMINATOR
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
EXT REF.IN
VIDEO IN
PVW-2650P
COMPOSITE WAVEFORM MONITOR (1751)

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Set S702 (CHROMA) (L-5) on the VP-33 board to OFF. Step 1 • Connect the waveform monitor to VIDEO OUT 3 connector.	VIDEO OUT 3 waveform monitor  A=700.0±3.5 mV p-p (adjustment) B=300±3 mV p-p (check)	(A) (VIDEO 3) ⊘RV709/VP-33 (P-5) (B) (Check) TRIG: REF. VIDEO
Step 2 • Connect the waveform monitor to the TV terminal (2-6 (G)) of MONITOR OUTPUT (TV-8P) connector. • After adjustment is completed, set S702/VP-33 to ON.	MONITOR OUT waveform monitor  A=700±7 mV p-p B=300±3 mV p-p	(Check) TRIG: REF. VIDEO

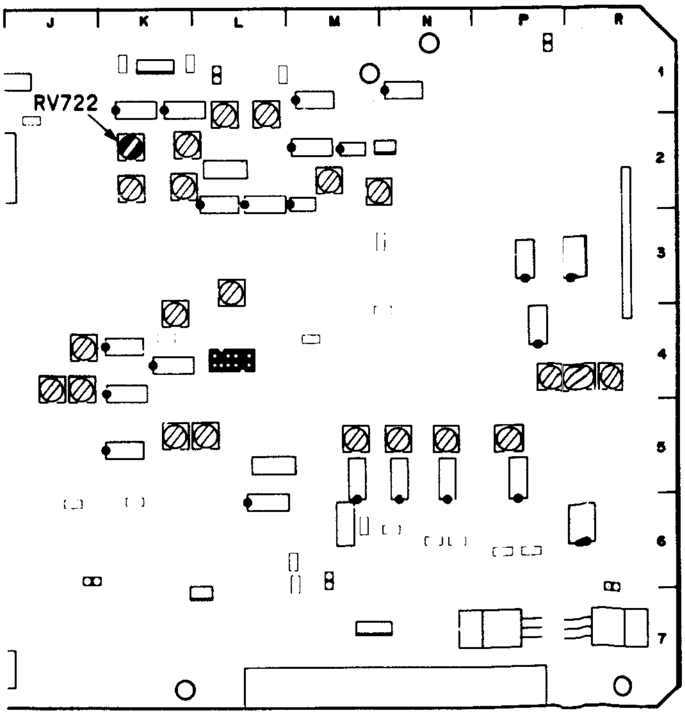
11-3-6. COMPONENT 2 and 1 R−Y OUT Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00−17:00) of the alignment tape CR5-1B PS. Step 1 • Connect the waveform monitor to COMPONENT 2 R−Y OUTPUT connector.	COMPONENT 2 R−Y OUT waveform monitor  A=700.0±3.5 mV p-p	●RV722/VP-33 (K-2) TRIG: REF. VIDEO CONNECTION 1
Step 2 • Connect the waveform monitor to R−Y terminal (3-4 (G)) of COMPONENT 1 OUTPUT connector. (using a multi connector cable DOBNC)	COMPONENT 1 (R−Y) OUT waveform monitor  A=700±7 mV p-p	(Check) TRIG: REF. VIDEO CONNECTION 1

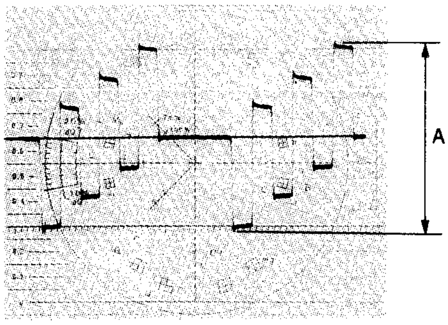
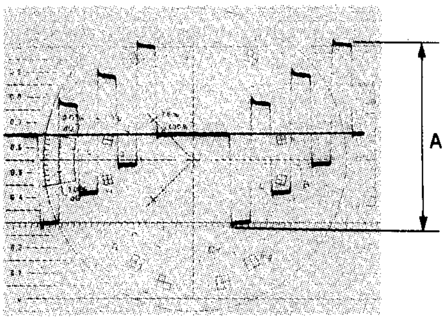
VP-33 board



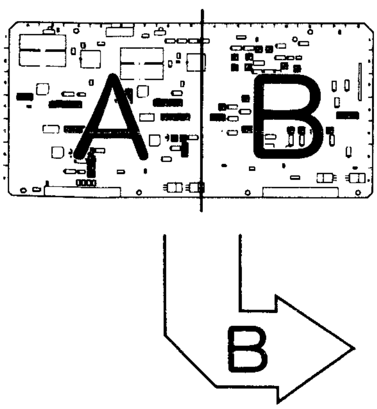
APPLICATION : 11-3-6.

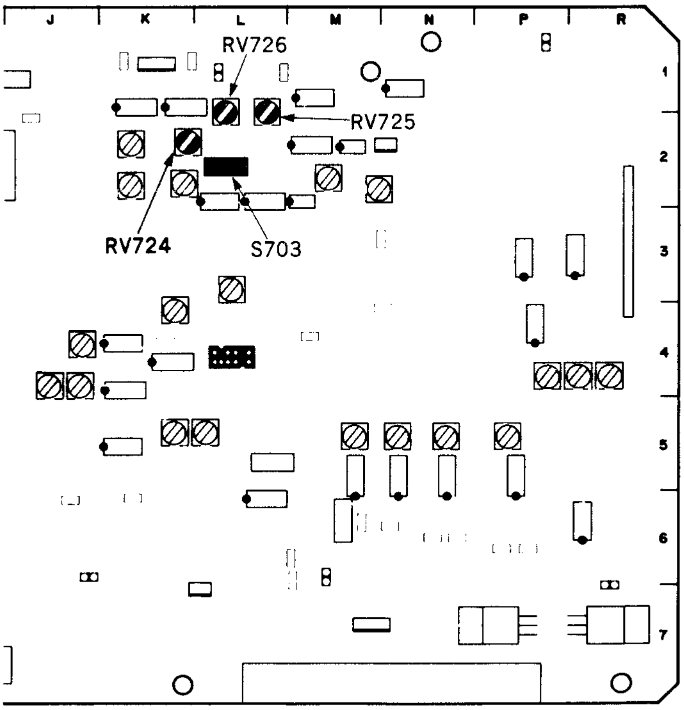


11-3-7. COMPONENT 2 and 1 B−Y OUT Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. Step 1 • Connect a waveform monitor to COMPONENT 2 B−Y OUTPUT connector.	COMPONENT 2 B−Y OUT waveform monitor  A=700.0±3.5 mV p-p	⊘RV724/VP-33 (K-2) TRIG: REF. VIDEO CONNECTION 1
Step 2 • Connect the waveform monitor to B−Y terminal (5-6 (G)) of COMPONENT 1 OUTPUT connector. (using a multi connector cable DOBNC)	COMPONENT 1 (B−Y) OUT waveform monitor  A=700±7 mV p-p	(Check) TRIG: REF. VIDEO CONNECTION 1

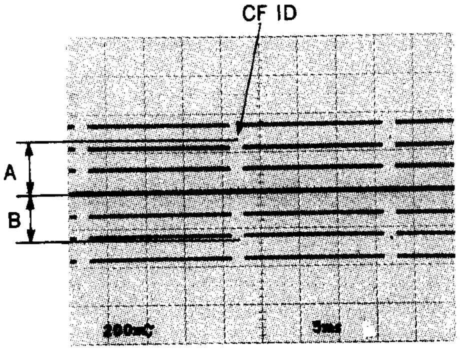
VP-33 board



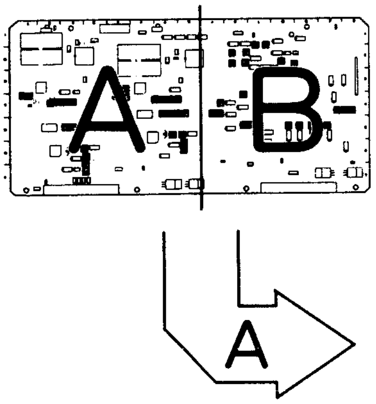


APPLICATION : 11-3-7.
11-3-8.

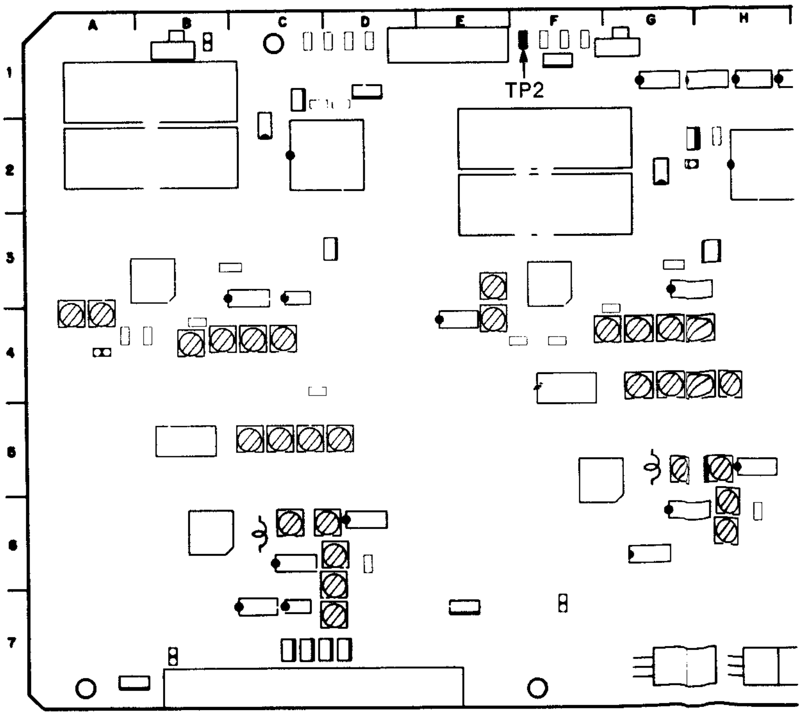
11-3-8. COMPONENT 2 B−Y CF ID Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00−17:00) of the alignment tape CR5-1B PS. • Set S703 (CF ID) (L-2) on the VP-33 board to ON. • CAPSTAN LOCK switch (sub control panel): 8FD • Terminate the CH1 of the oscilloscope at 75 Ω. • Connect the CH1 of the oscilloscope to COMPONENT 2 B−Y OUTPUT connector.	COMPONENT 2 B−Y OUT oscilloscope  (1) A=262.5±10 mV p-p B=262.5±10 mV p-p (2) Check that CF ID pulse will disappear when the CAPSTAN LOCK switch is set to 2FD. After that, set the switch to 8FD.	(A) (ID (+)) ⊘RV725/VP-33 (L-1) (B) (ID (−)) ⊘RV726/VP-33 (L-1) TRIG: TP2/VP-33 (F-1) CONNECTION 1

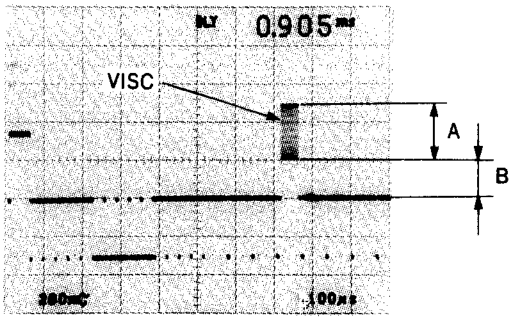
VP-33 board



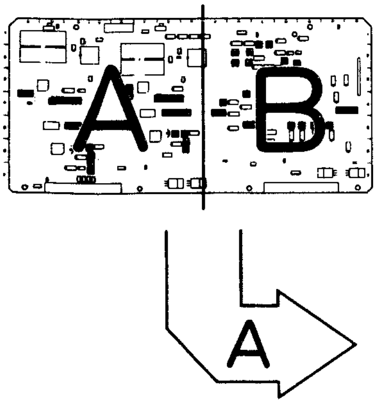
APPLICATION : 11-3-8.



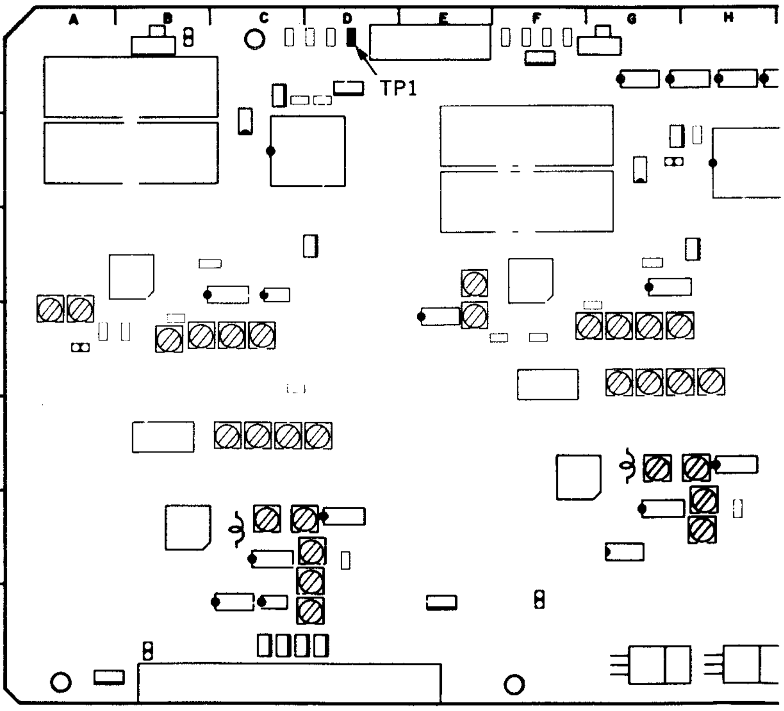
11-3-9. COMPONENT 2 Y VISC Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the composite H sweep signal portion with VISC (28:00—30:00) of the alignment tape CR5-1B PS. • CAPSTAN LOCK switch (sub control panel): 8FD • Terminate the CH1 of the oscilloscope at 75 Ω. • Connect the CH1 of the oscilloscope to COMPONENT 2 Y OUTPUT connector.	COMPONENT 2 Y OUT oscilloscope  (1) $A = 300^{+0}_{-20}$ mV p-p $B = 200 \pm 10$ mV (2) Check that VISC signal pulse will disappear when the CAPSTAN LOCK switch is set to 2FD. After that, set the switch to 8FD.	(A) (VISC LEVEL) ⊘RV719/VP-33 (K-5) (B) (VISC DC) ⊘RV720/VP-33 (L-5) TRIG: TP1/VP-33 (D-1) CONNECTION 1

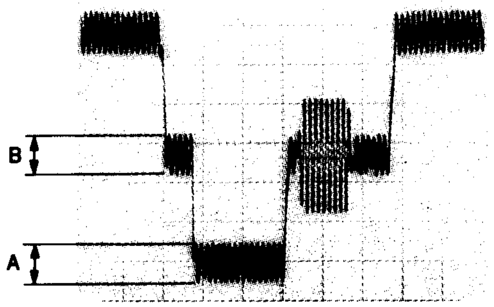
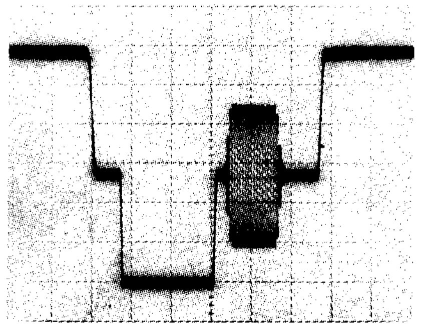
VP-33 board



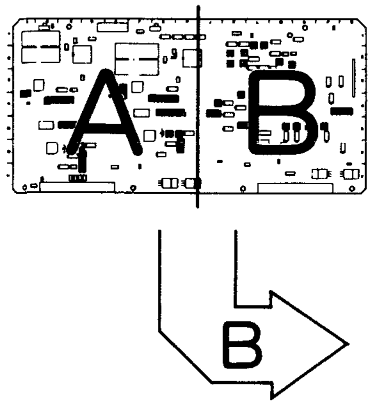
APPLICATION : 11-3-9.



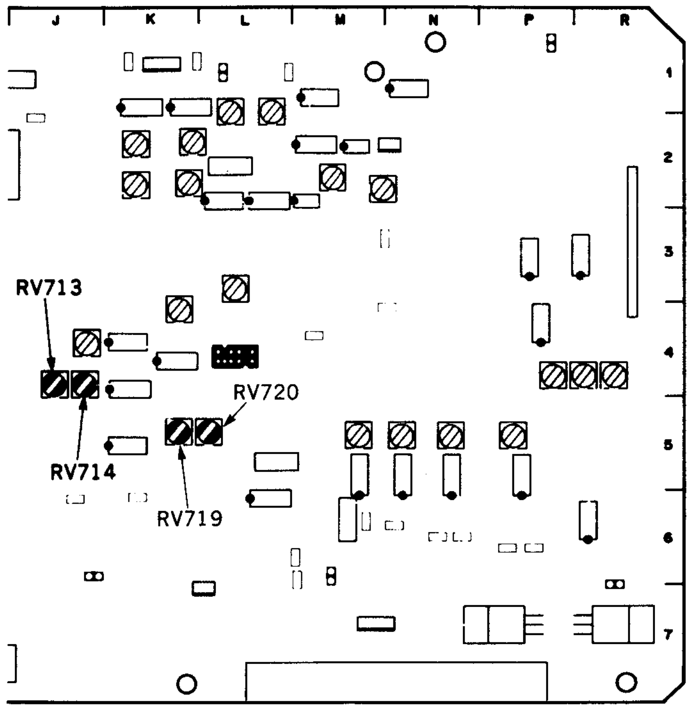
11-3-10. VIDEO OUT 1 ENC SC Leak Adjustment

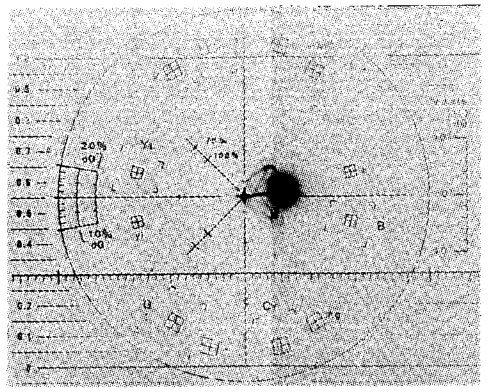
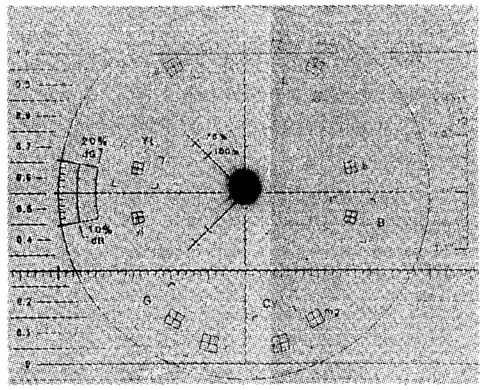
Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. • Connect a waveform/vector monitor to VIDEO OUT 1 connector. • Set the time axis of the wave form monitor to magnification mode.	VIDEO OUT 1 WFM mode **Before adjustment**  ⇩ **After adjustment**  Minimize the A. (less than 10 mV p-p) Minimize the B. (less than 10 mV p-p)	(A) (U SC LEAK) ⊘RV714/VP-33 (J-4) (B) (V SC LEAK) ⊘RV713/VP-33 (J-4) Adjust alternately. TRIG: REF. VIDEO CONNECTION 2

VP-33 board

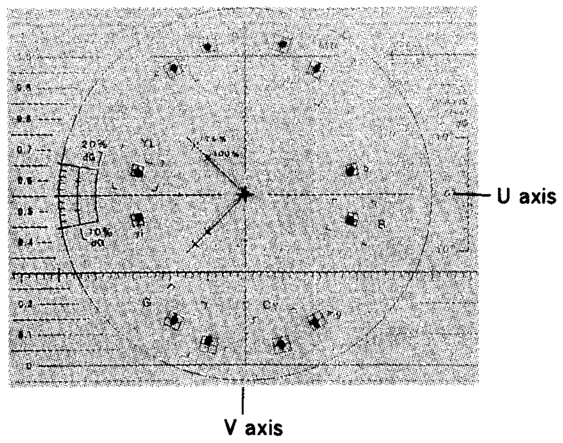


APPLICATION : 11-3-9.
11-3-10.

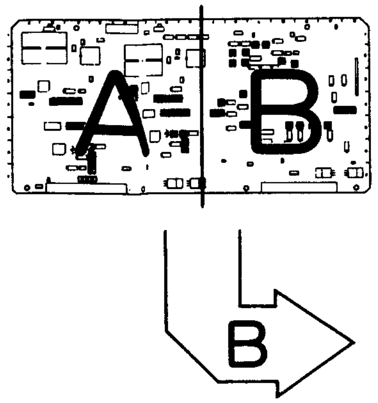


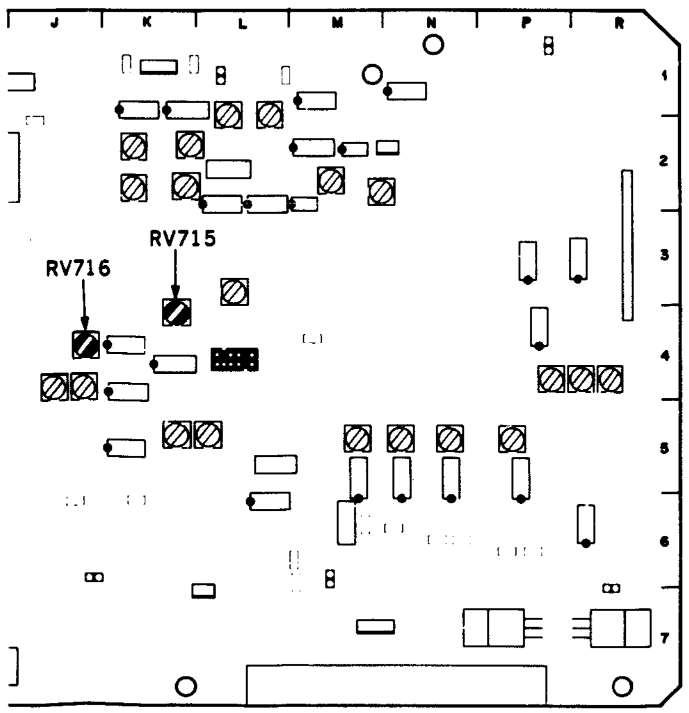
Preparations for adjustment	Specifications	Adjustments
• Play back the flat field signal portion (24:00—26:00) of the alignment tape CR5-1B PS. • Connect a waveform/vector monitor to VIDEO OUT 1 connector. • Set the time axis of the wave form monitor to magnification mode.	VIDEO OUT 1 SCH mode **Before adjustment**  ⇩ **After adjustment**  Maximum the gain of the vectorscope and check the dot is at center.	(Check) TRIG: REF. VIDEO CONNECTION 2

11-3-11. VIDEO OUT 1 Chroma Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect a vectorscope to VIDEO OUT 1 connector.	VIDEO OUT 1 VECTOR mode  (A) Set the dots of the burst on the right position on the scale. (B) Set the "R" dot onto the center of ⊞ mark. (C) Set the "B" dot onto the center of ⊞ mark. Adjust (B) and (C) alternately so that all dots should be inside each ⊞ mark. If it does not, perform fine adjustment of 11-2-6. U—V Axis Phase Adjustment.	(A) Burst PHASE control/vectorscope (B) V axis (ENC R—Y) ⊘RV716/VP-33 (J-4) (C) U axis (ENC B—Y) ⊘RV715/VP-33 (K-4) TRIG: REF. VIDEO CONNECTION 2

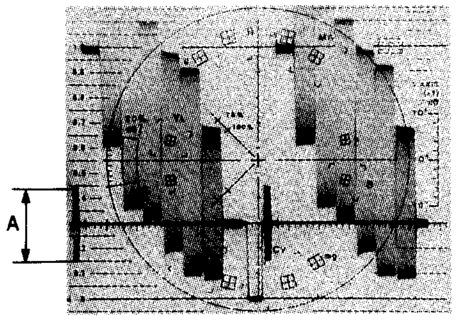
VP-33 board



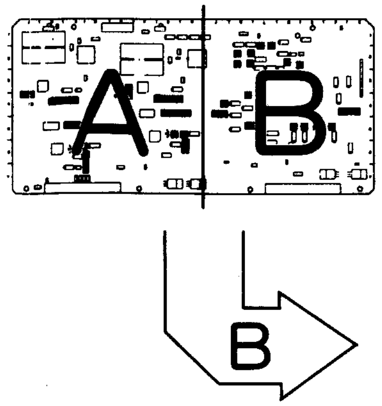


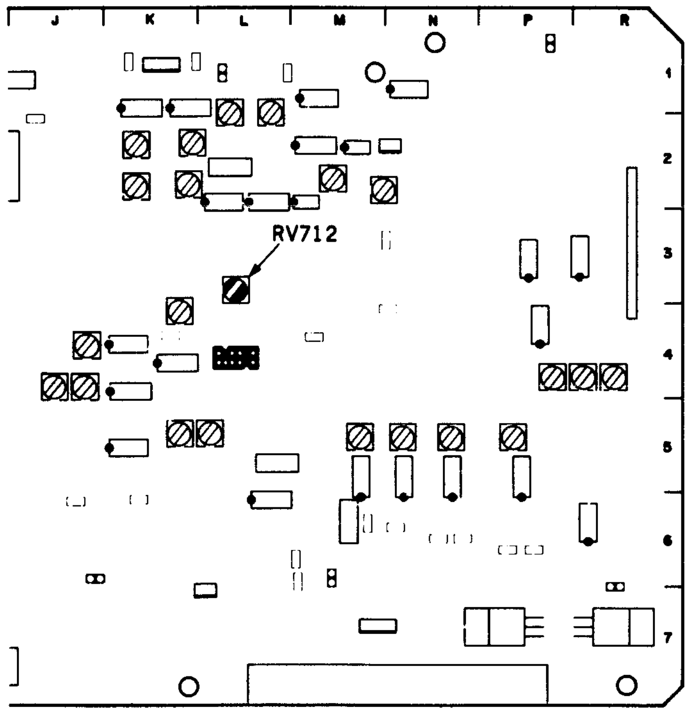
APPLICATION: 11-3-11.

11-3-12. VIDEO OUT 1 Burst Level Adjustment

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect a waveform monitor to VIDEO OUT 1 connector.	VIDEO OUT 1 waveform monitor  A=300.0±1.5 mV p-p	⊘RV712/VP-33 (L-3) TRIG: REF. VIDEO CONNECTION 2

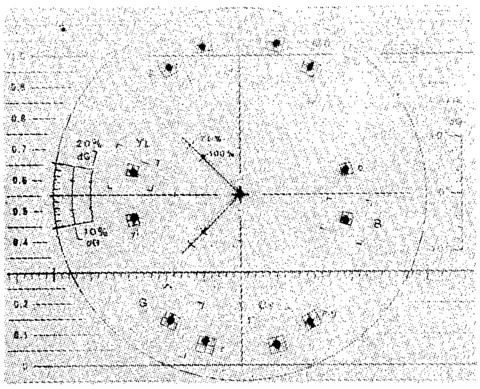
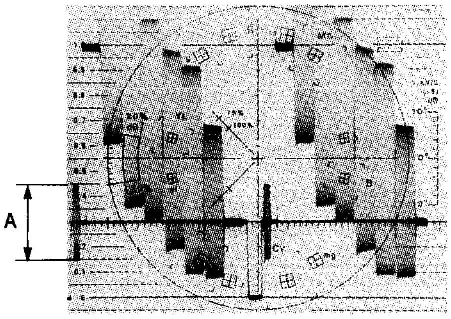
VP-33 board



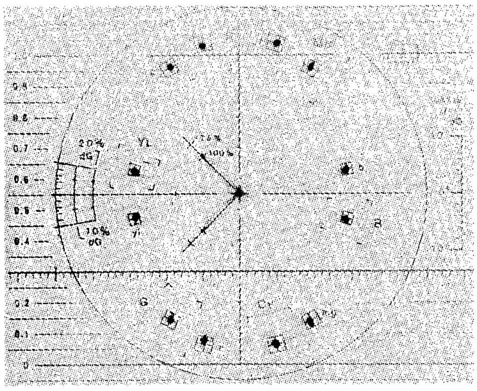
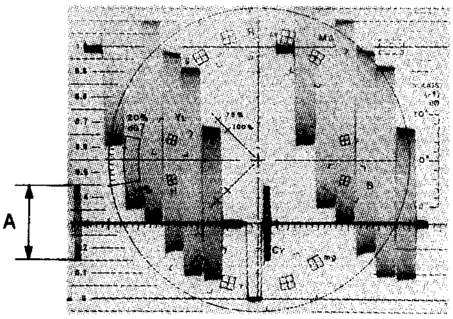


APPLICATION: 11-3-12.

11-3-13. VIDEO OUT 2 Chroma Level and Burst Level Check

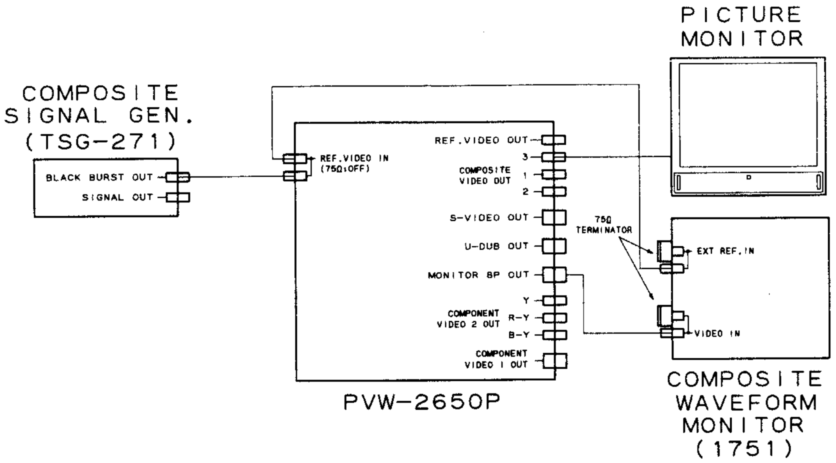
Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect a waveform/vector-monitor to VIDEO OUT 2 connector. Step 1 • Use the waveform/vector monitor as a vectorscope, set the dots of the burst on the right position on the scale by PHASE control.	VIDEO OUT 2 VECTOR mode  All dots should be inside each ⊞ mark on the vectorscope.	(Chroma level check) TRIG: REF. VIDEO CONNECTION 2
Step 2 • Use the waveform/vector monitor as a waveform monitor.	VIDEO OUT 2 WFM mode  A=300±3 mV p-p	(Burst level check) TRIG: REF. VIDEO CONNECTION 2

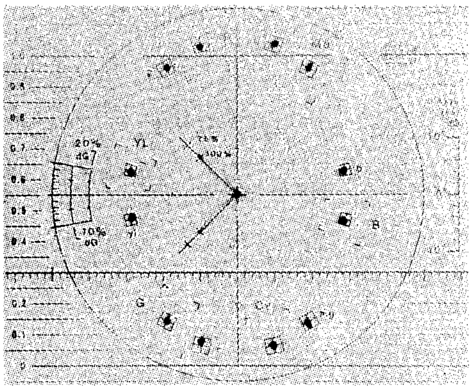
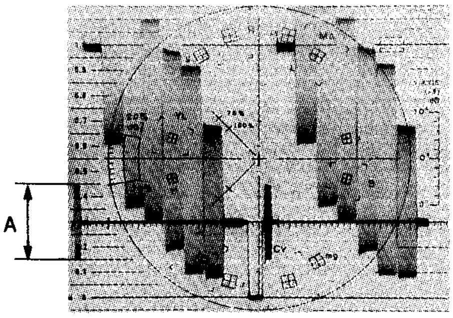
11-3-14. VIDEO OUT 3 Chroma Level and Burst Level Check

Preparations for adjustment	Specifications	Adjustments
- Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. - Connect a waveform/vector-monitor to VIDEO OUT 3 connector. Step 1 - Use the waveform/vector monitor as a vectorscope, set the dots of the burst on the right position on the scale by PHASE control.	VIDEO OUT 3 VECTOR mode  All dots should be inside each ⊞ mark on the vectorscope.	(Chroma level check) TRIG: REF. VIDEO CONNECTION 2
Step 2 - Use the waveform/vector monitor as a waveform monitor.	VIDEO OUT 3 WFM mode  A=300.0±4.5 mV p-p	(Burst level check) TRIG: REF. VIDEO CONNECTION 2

11-3-15. MONITOR OUT Chroma Level and Burst Level Check

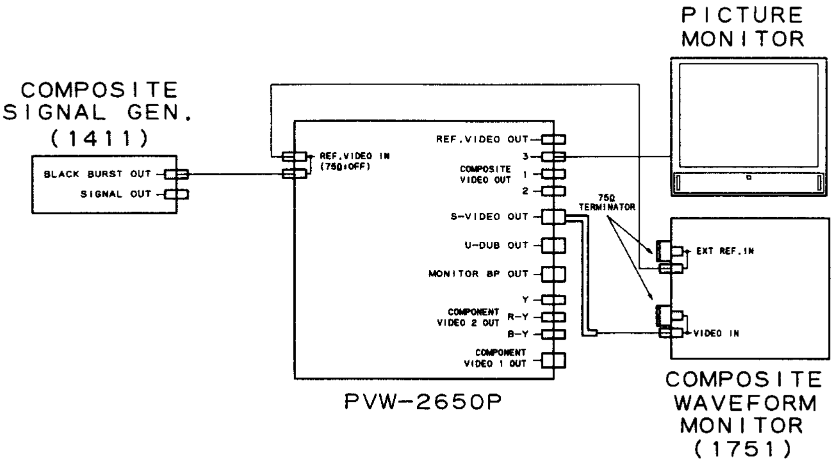
[**CONNECTION**]

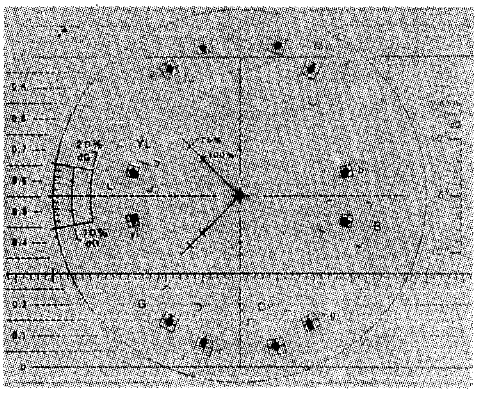
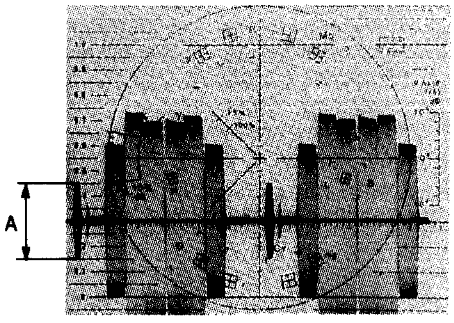

PICTURE MONITOR
COMPOSITE SIGNAL GEN. (TSG-271)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
75Ω TERMINATOR
EXT REF.IN
VIDEO IN
PVW-2650P
COMPOSITE WAVEFORM MONITOR (1751)

Preparations for adjustment	**Specifications**	**Adjustments**
- Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. - Connect a waveform/vector-monitor to the TV terminal (2-6(G)) of MONITOR OUT (TV-8P) connector. Step 1 - Use the waveform/vector monitor as a vectorscope, set the dots of the burst on the right position on the scale by PHASE control.	MONITOR OUT VECTOR mode  All dots should be inside each ⊞ mark on the vectorscope.	(Chroma level check) TRIG: REF. VIDEO
Step 2 - Use the waveform/vector monitor as a waveform monitor.	MONITOR OUT WFM mode  A=300.0±4.5 mV p-p	(Burst level check) TRIG: REF. VIDEO

11-3-16. S-VIDEO OUT Chroma Level and Burst Level Check

[CONNECTION]


COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF. VIDEO IN (75Ω:OFF)
REF. VIDEO OUT
COMPOSITE VIDEO OUT 3 1 2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
COMPONENT VIDEO 2 OUT Y R-Y B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P
75Ω TERMINATOR
PICTURE MONITOR
EXT REF. IN
VIDEO IN
COMPOSITE WAVEFORM MONITOR (1751)

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00~17:00) of the alignment tape CR5-1B PS. • Connect a waveform/vector-monitor to the C terminal (4-2G) of S-VIDEO OUT connector. Step 1 • Use the waveform/vector monitor as a vectorscope, set the dots of the burst on the right position on the scale by PHASE control.	S-VIDEO C OUT vectorscope  All dots should be inside the 3/4 size area of each [ ] mark, which is out side of the ⊞ mark on the vectorscope.	(Chroma level check) TRIG: REF. VIDEO
Step 2 • Use the waveform/vector monitor as a waveform monitor.	S-VIDEO C OUT waveform monitor  A=300±45 mV p-p	(Burst level check) TRIG: REF. VIDEO

SECTION 12
VIDEO OVERALL ALIGNMENT

[Equipment Required]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
  - Component SG (TEKTRONIX TSG-300 or equivalent)
  - Composite SG (TEKTRONIX 1411 or equivalent)
  - Digital Composite (TEKTRONIX TSG-271 or equivalent)
- Network Analyzer (ANRITSU MS-420B or equivalent)
- Waveform Monitor
  - Component (TEKTRONIX WFM300/WFM300A/1781R or equivalent)
  - Composite (TEKTRONIX 1481C/1751/1781R or equivalent)
- Spectrum Analyzer (ADVANTEST R4131 B/D or equivalent)
- Picture Monitor
- Head Coupling Tool
- Alignment Tape CR5-2A PS (part No. 8-960-098-44)

Contents

TIME min s	VIDEO TRACK
0: 00	75% Color Bars
3: 00	60% Multi burst Y: 0.5,1.0,2.0,3.0,4.1,4.5 MHz C: 0.2, 0.5,1.0,1.5,2.0 MHz
6: 00	50% Bowtie & 10T
9: 00	Pulse & bar
11: 00	Quad phase
13: 00	Composite Monoscope
15: 00	

- Alignment Tape CR5-1B PS (part No. 8-960-096-91)

Contents

TIME min s	VIDEO TRACK	AFM
0: 00	RF Sweep Marker 1,2,4,6,8,10,12 MHz	No-Signal
2: 00	60% H-Sweep (CTDM) Marker 0.5,1,2,3,4,5 MHz	
5: 00	Pulse & Bar (CTDM)	
8: 00	60% Multi Burst Y: 0.5,1,2,4,5,5.5 MHz C: 0.2, 0.5,1,1.5,2 MHz	
11: 00	Pulse & Bar	
14: 00	100% Color Bars	400 Hz Sine Wave 25 kHz Deviation
16: 30		75 kHz Deviation
17: 00	50% Bowtie & 10T	No-Signal
19: 00	Line 17A Signal	
22: 00	Quad Phase	
24: 00	50% Flat Field	
26: 00	100% Color Bars with dropout	
28: 00	Composite H-Sweep with VISC	
30: 00		

[Switch/Setup menu Setting]

This setting should not be changed in position unless otherwise specified.

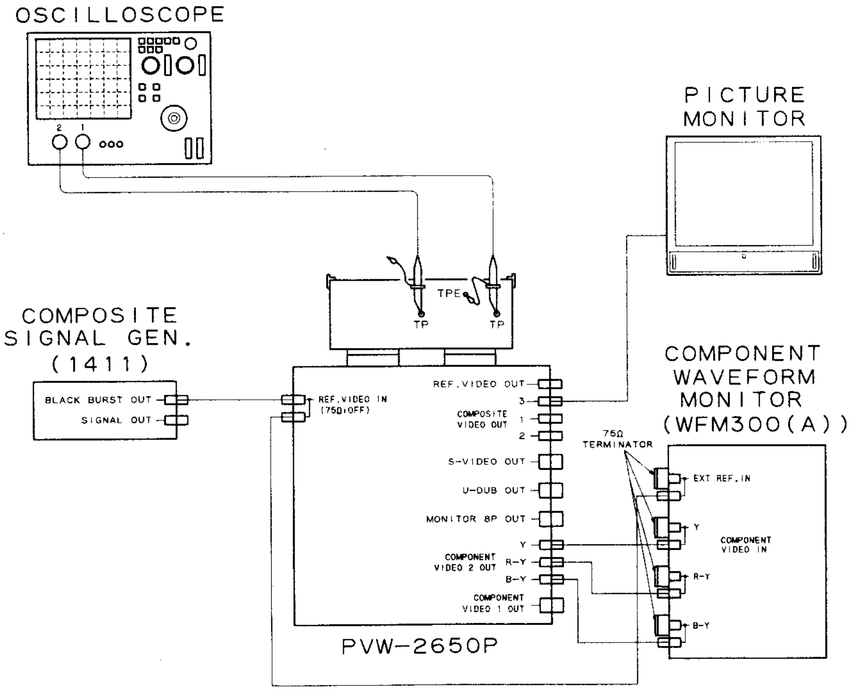
<Control Panel>
upper
LOCAL/REMOTE: LOCAL
lower
CTL/TC/U-BIT: TC

<Sub Control Panel>
CHARACTER: ON
TC: LTC
CAPSTAN LOCK: 8FD
TBC CONTROL: LOCAL
  VIDEO: PRESET
  CHROMA: PRESET
  SET UP: PRESET
  Y/C DELAY: PRESET

[Connection]

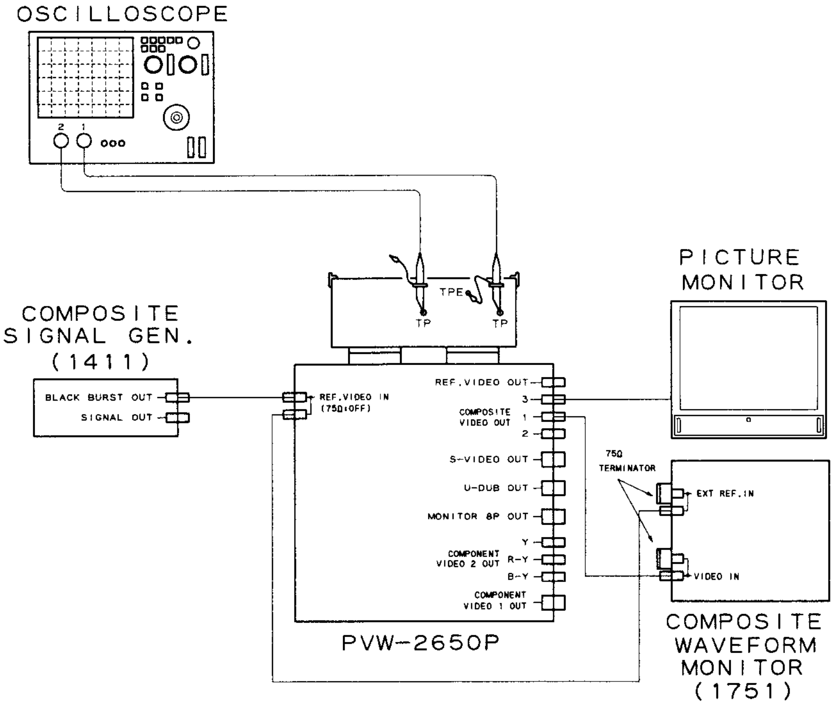
Connect some equipment as following unless otherwise specified.

CONNECTION1
SG 1411/Waveform Monitor WFM-300 (A)/Oscilloscope/Picture Monitor

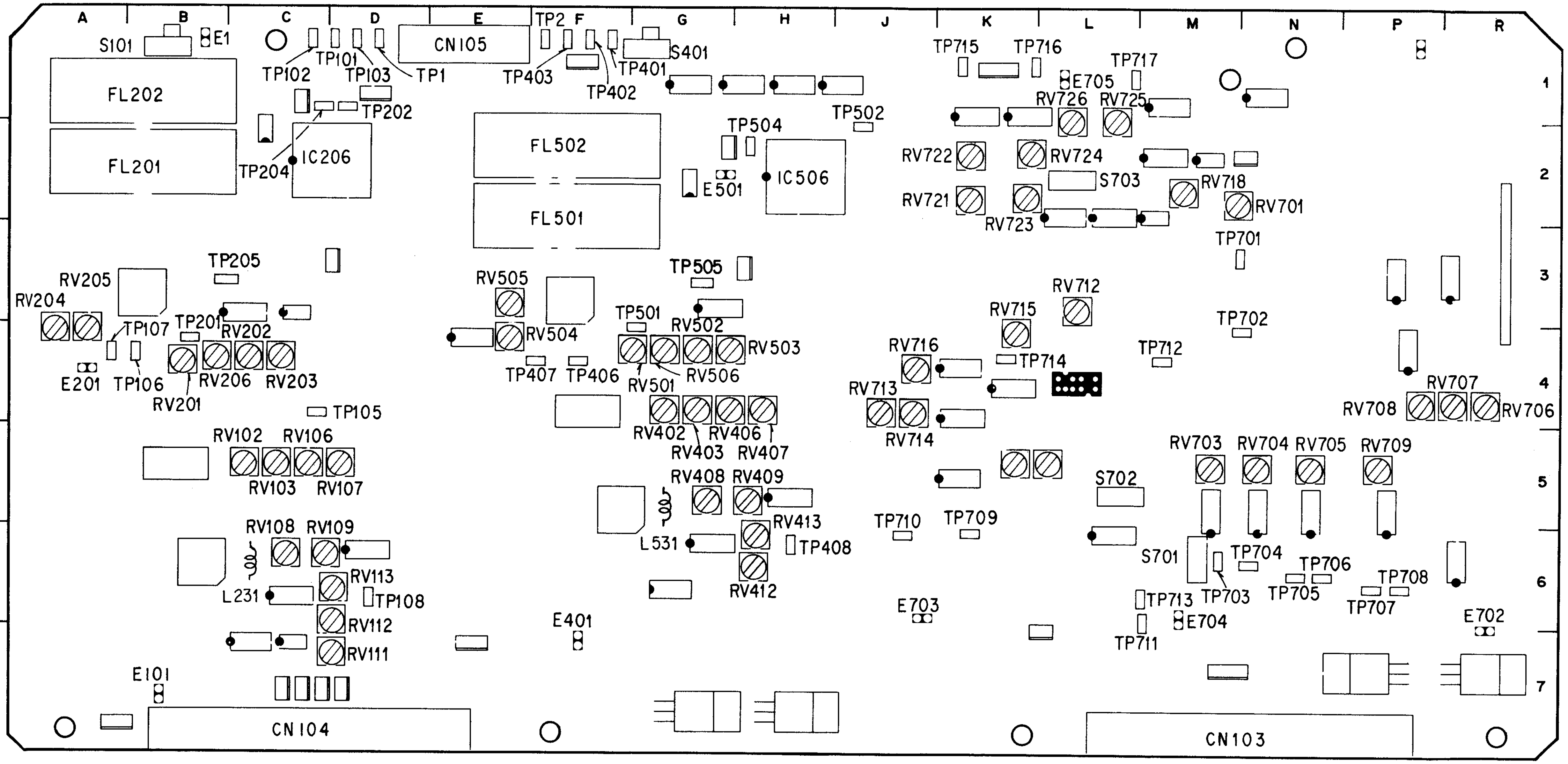

OSCILLOSCOPE
2
1
PICTURE MONITOR
TPE
TP
TP
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P
COMPONENT WAVEFORM MONITOR (WFM300(A))
75Ω TERMINATOR
EXT REF.IN
Y
COMPONENT VIDEO IN
R-Y
B-Y

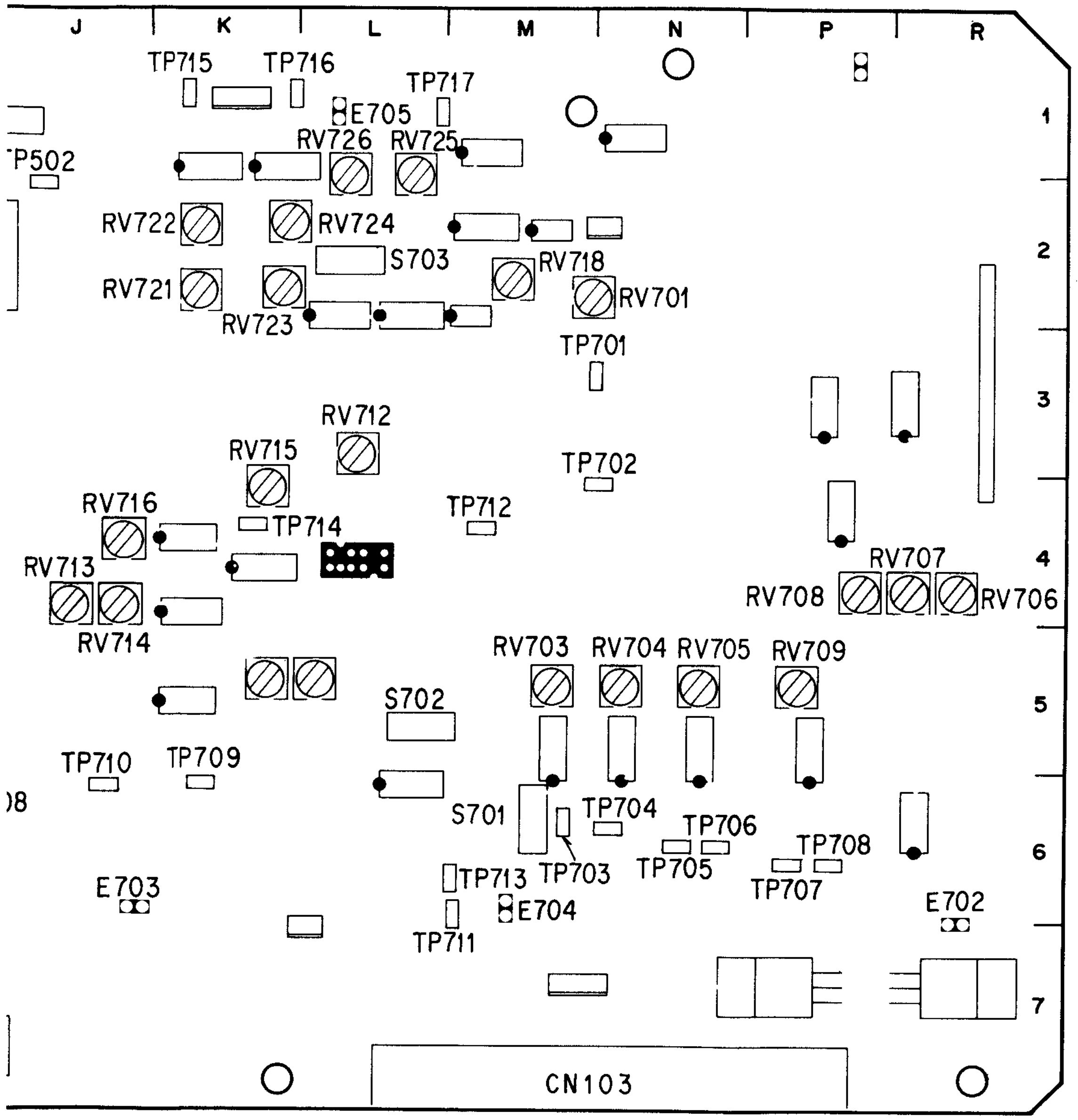
CONNECTION2

SG 1411/waveform Monitor 1751/Oscilloscope/Picture Monitor


OSCILLOSCOPE
2
1
TPE
TP
TP
PICTURE MONITOR
COMPOSITE SIGNAL GEN. (1411)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P
75Ω TERMINATOR
EXT REF.IN
VIDEO IN
COMPOSITE WAVEFORM MONITOR (1751)

VP-33 board (A SIDE)


A
B
C
D
E
TP2
F
G
H
J
K
L
M
N
P
R
1
2
3
4
5
6
7
S101
E1
FL202
FL201
TP102
TP101
TP103
TP1
CN105
TP403
TP401
TP402
S401
TP202
TP204
IC206
FL502
FL501
TP504
TP502
IC506
E501
TP715
TP716
TP717
E705
RV726
RV725
RV722
RV724
S703
RV721
RV723
RV718
RV701
TP701
TP205
RV205
RV204
TP107
TP201
RV202
E201
TP106
RV206
RV203
RV201
TP105
RV505
RV504
TP407
TP406
TP501
TP505
RV502
RV503
RV501
RV506
RV712
RV715
RV716
TP714
RV713
TP702
TP712
RV707
RV708
RV706
RV102
RV106
RV103
RV107
RV402
RV403
RV406
RV407
RV714
RV408
RV409
RV413
TP408
L531
RV412
RV703
RV704
RV705
RV709
S702
TP710
TP709
RV108
RV109
L231
RV113
TP108
RV112
RV111
E401
E703
S701
TP704
TP706
TP713
TP703
TP705
TP708
TP707
E704
TP711
E702
E101
CN104
CN103


J
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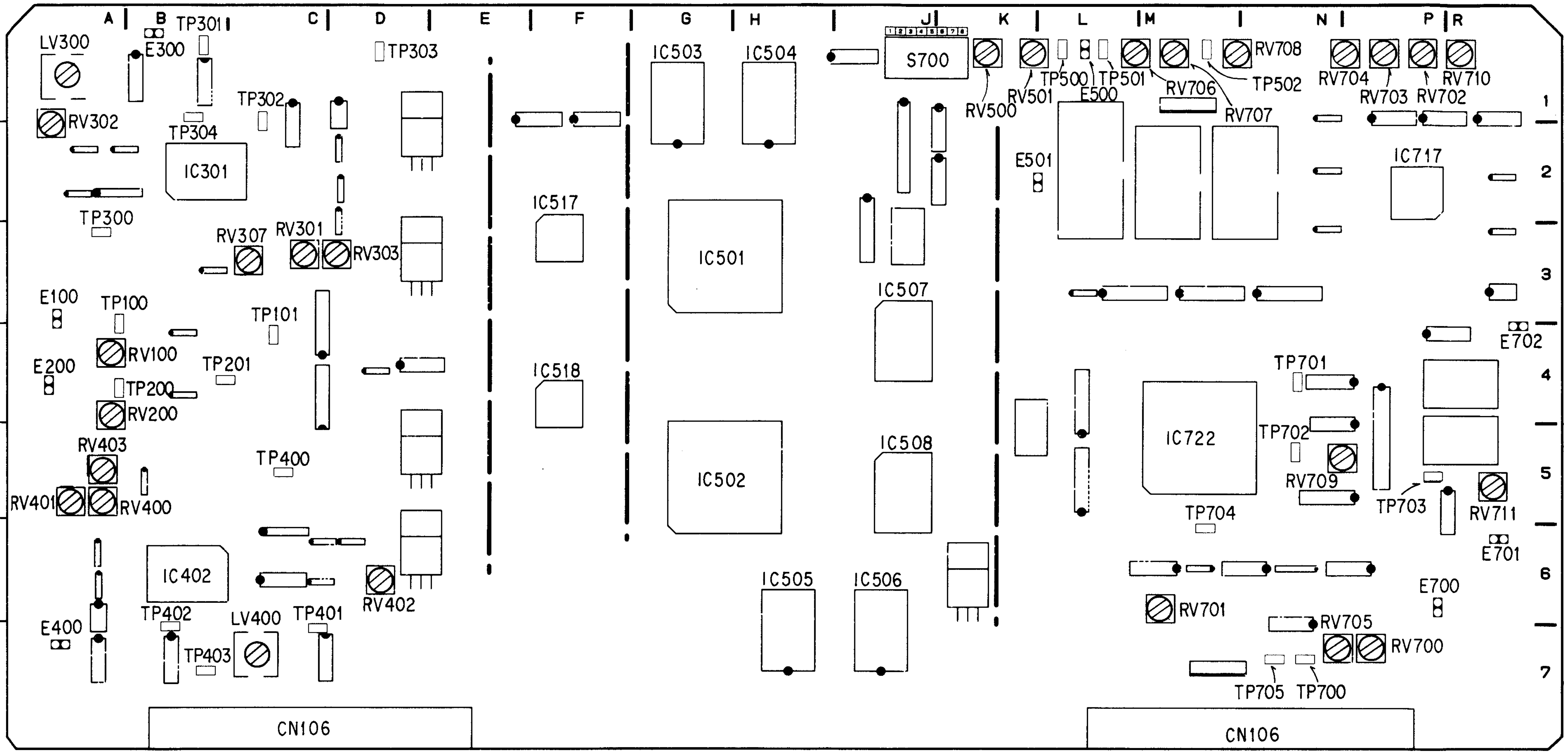
TP715
TP716
TP717
E705
RV726
RV725
P502
RV722
RV724
S703
RV718
RV701
RV721
RV723
TP701
RV712
RV715
TP702
RV716
TP714
TP712
RV713
RV707
RV708
RV706
RV714
RV703
RV704
RV705
RV709
S702
TP710
TP709
8
S701
TP704
TP706
TP708
TP705
TP707
E703
TP713
TP703
E704
E702
TP711
CN103

TBC-18 board (A SIDE)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LV300
E300
TP301
TP303
IC503
IC504
S700
RV500
RV501
TP500
TP501
E500
RV706
RV707
TP502
RV708
RV704
RV703
RV702
RV710
RV302
TP302
TP304
IC301
IC717
E501
TP300
RV307
RV301
RV303
IC517
IC501
IC507
E100
TP100
TP101
E702
RV100
E200
TP201
TP200
RV200
IC518
TP701
IC722
TP702
RV403
TP400
IC502
IC508
RV709
TP703
RV711
RV401
RV400
TP704
E701
IC402
IC505
IC506
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LV400
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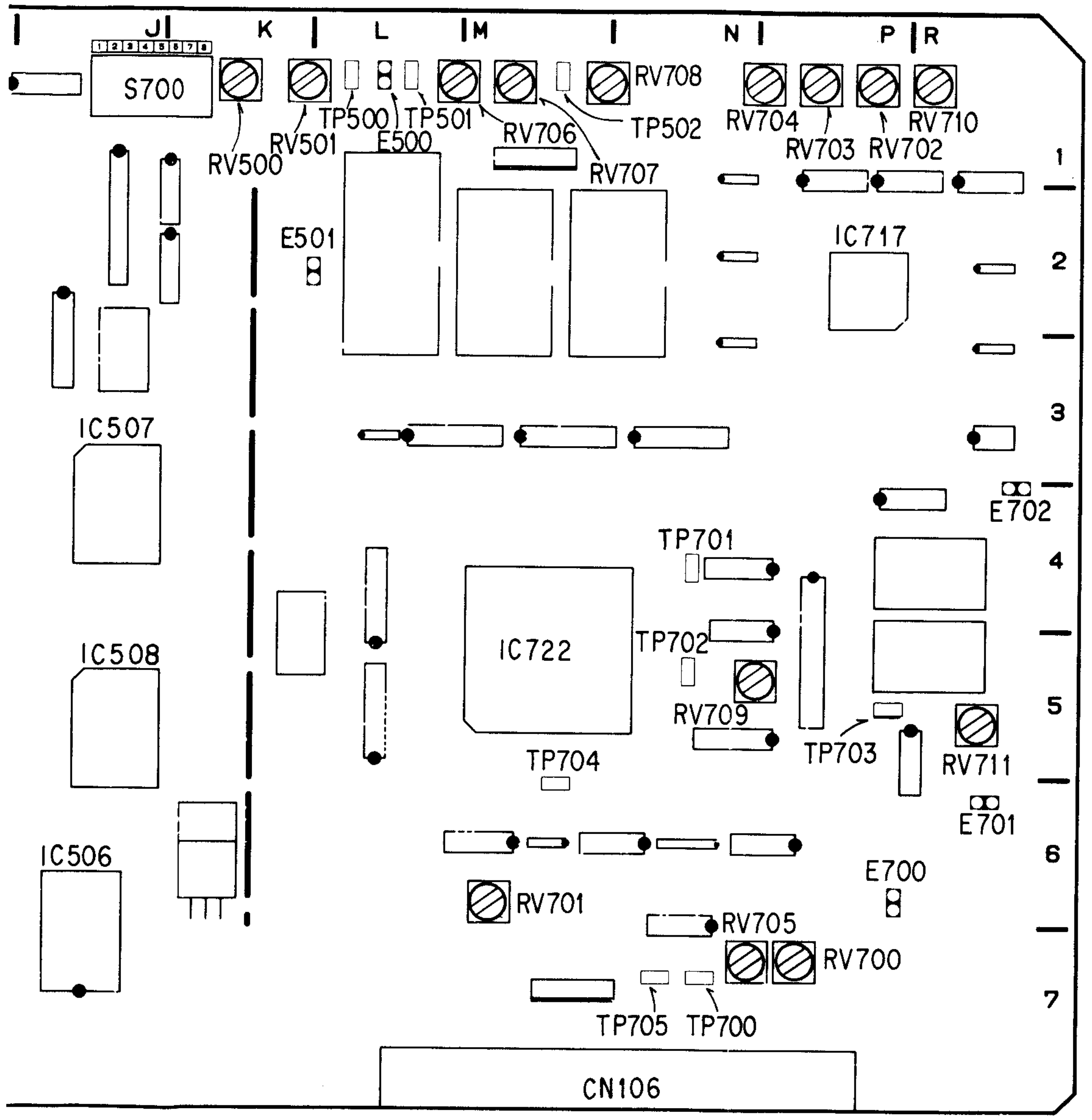
RV700
TP403
TP705
TP700
CN106
CN106


J
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7
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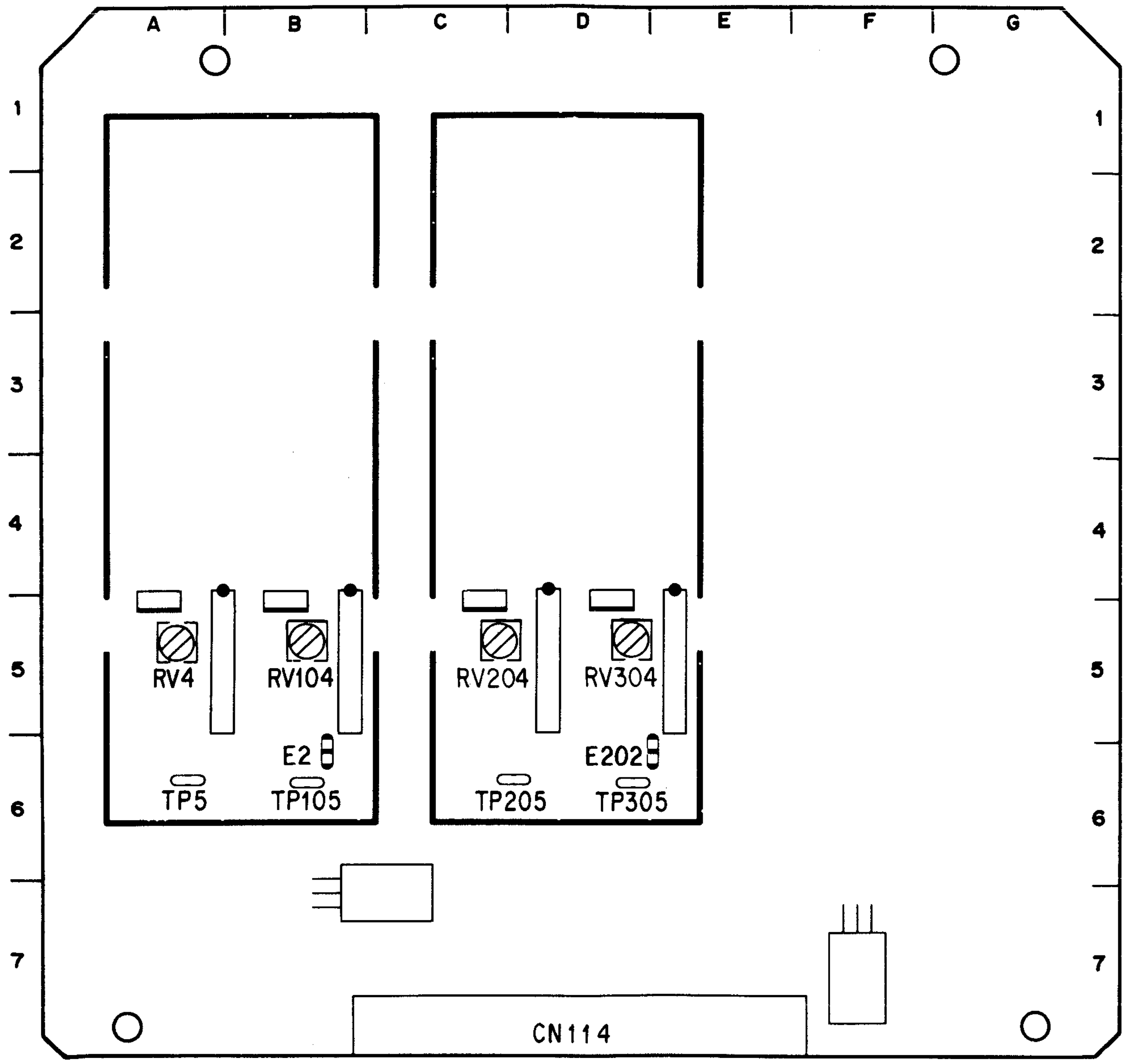
S700
RV500
RV501
TP500
TP501
E500
RV706
RV707
RV708
TP502
RV704
RV703
RV702
RV710
E501
IC717
IC507
IC508
IC506
E702
TP701
IC722
TP702
RV709
TP703
RV711
TP704
E701
E700
RV701
RV705
RV700
TP705
TP700
CN106

RP-57 board (A SIDE)


A
B
C
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E
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G
1
2
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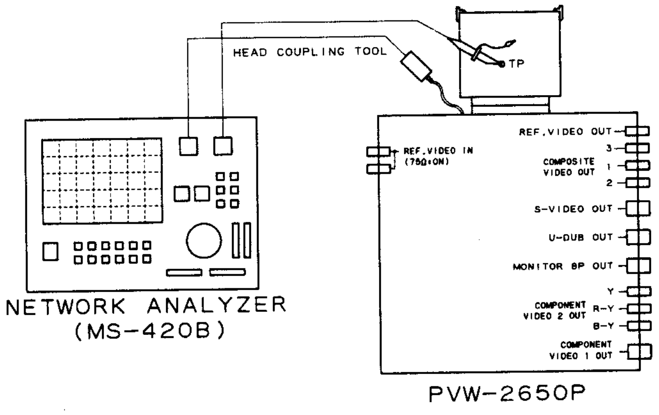
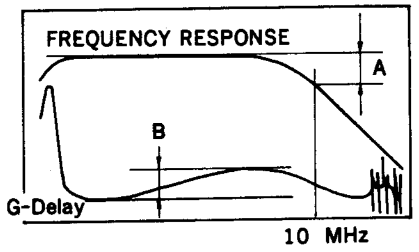
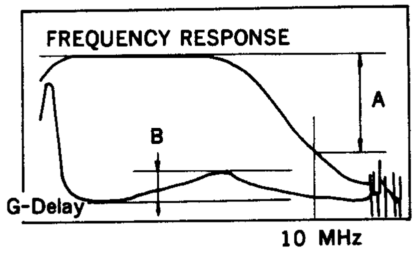
4
5
6
7
RV4
RV104
RV204
RV304
E2
E202
TP5
TP105
TP205
TP305
CN114

12-1. Y and C PB RF FREQUENCY RESPONSE ADJUSTMENT

[CONNECTION]

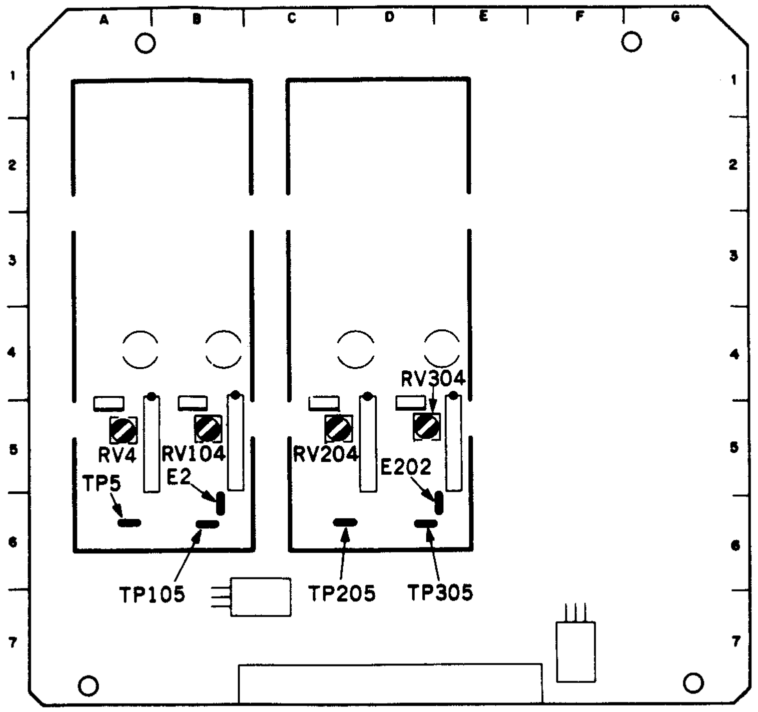

HEAD COUPLING TOOL
TP
NETWORK ANALYZER
(MS-420B)
REF.VIDEO IN
(75Ω:ON)
REF.VIDEO OUT
3
COMPOSITE VIDEO OUT
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
Y
COMPONENT VIDEO 2 OUT
R-Y
B-Y
COMPONENT VIDEO 1 OUT
PVW-2650P

Preparations for adjustment	Specifications	Adjustments
• Attach a head coupling tool to the drum. Depending on the channel to be adjusted, replace the tool to the head for its channel. • Depending on the channel to be adjusted, connect the INPUT probe of a network analyzer to the test point for its channel. • Use the network analyzer in the following modes: RECALL-5 for Y adjustment RECALL-6 for C adjustment • After adjustment is completed, remove the tool.	CH-A: TP5-E2(GND)/RP-57(A-6)(B-6) CH-B: TP105-E2(GND)/RP-57(B-6)(B-6) network analyzer  $A = -1.5^{+1.0}_{-1.5}$ dB $B = -2 \pm 3$ ns	(Y PB RF F. RESP.) CH-A: ⊘RV4/RP-57(A-4) CH-B: ⊘RV104/RP-57(B-4)
	CH-A: TP205-E202(GND)/RP-57(D-6)(E-6) CH-B: TP305-E202(GND)/RP-57(D-6)(E-6) network analyzer  $A = -3 \pm 1$ dB $B = -5 \pm 3$ ns	(C PB RF F. RESP.) CH-A: ⊘RV204/RP-57(D-4) CH-B: ⊘RV304/RP-57(E-4)

NOTE: This adjustment is impossible without a network analyzer.
If any of RV4, RV104, RV204 and RV304 is moved unintentionally, as a temporary measure, set the volume to the same mechanical position as any other volume which is not moved.

APPLICATION: 12-1.

RP-57 board


A
B
C
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G
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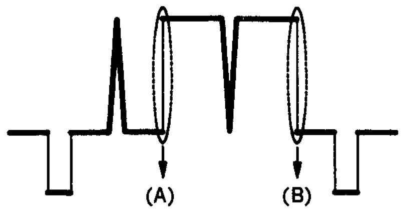
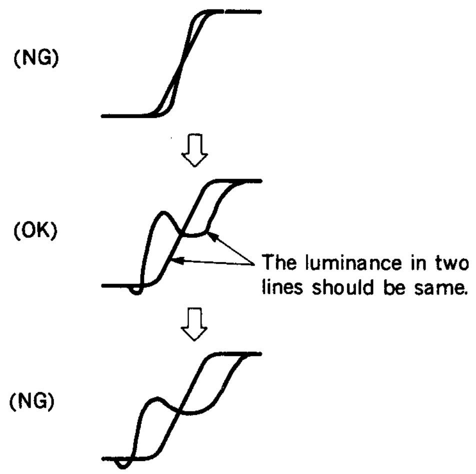
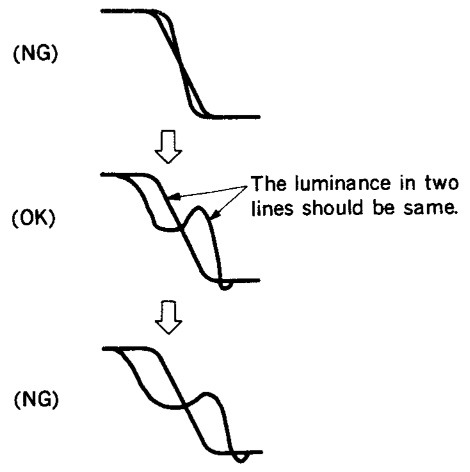
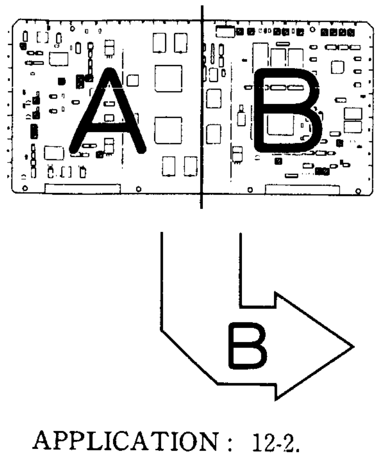
3
4
5
6
7
RV4
RV104
RV204
RV304
TP5
E2
E202
TP105
TP205
TP305

12-2. NOISE REDUCE ADJUSTMENT

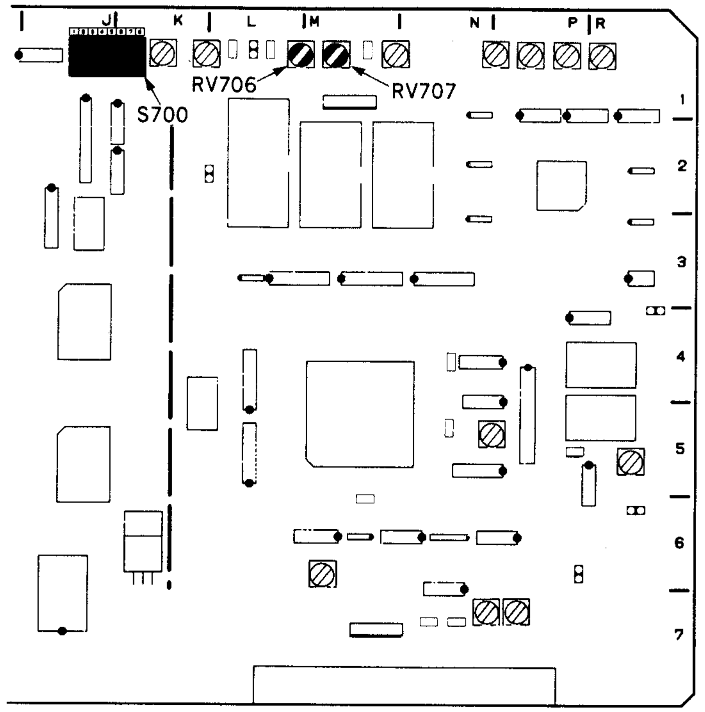
- Before performing this adjustment, use tape aligned by the PVW-2800P.
- INPUT SELECT switch: COMPOSITE
- Supply a pulse & bar signal (−1.5 dB) to the PVW-2800P's VIDEO INPUT connector.
- Record the pulse & bar signal.

Preparations for adjustment	Specifications	Adjustments
• Play back the pulse & bar signal that is recorded on tape by PVW-2800P as mentioned above. • Connect the waveform monitor to the COMPONENT 2 Y OUTPUT connector. • Set S700-2 (ENR TEST) (J-1) and S700-4 (C MUTE) (J-1) on the TBC-18 board to ON.	COMPONENT 2 Y OUT waveform of the waveform monitor  Expanded (A) Confirm that rising edge changes as below, and set to (OK) position.  The luminance in two lines should be same. (B) Confirm that falling edge changes as below, and set to (OK) position.  The luminance in two lines should be same.	(A) (POSI EDGE) ⊘RV706/TBC-18 (M-1) (B) (NEGA EDGE) ⊘RV707/TBC-18 (M-1)
• After adjustment is completed, set S700-2 and S700-4 to OFF.		TRIG: INT/WFM CONNECTION 1

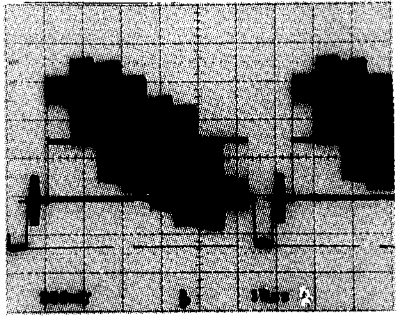
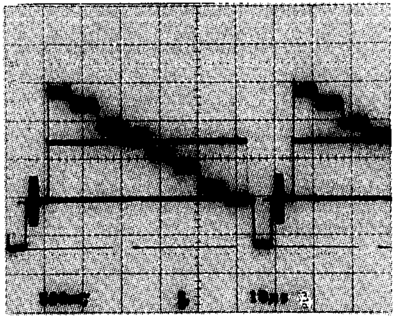
TBC-18 board



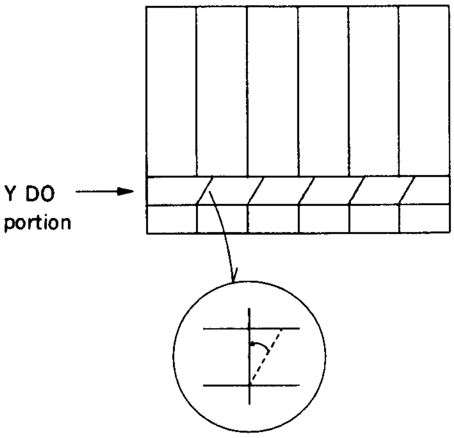
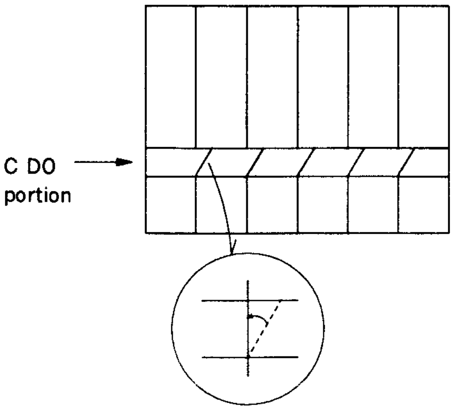
APPLICATION: 12-2.



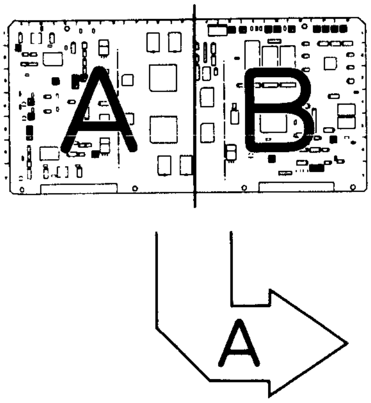
12-3. BID LEVEL CHECK

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • Connect a waveform monitor to VIDEO OUT 1 connector. • Connect a color-monitor to MONITOR OUT (TV-8P) connector.	MONITOR OUT color monitor (Reference) Waveform of the waveform monitor (VIDEO OUT 1) shuttle mode: +10 times speed  shuttle mode: +24 times speed  Check the following conditions in shuttle mode: (1) When set to the speed multiplied by −10,−1,+1, +10: Colored picture should appear on the color monitor. (2) When set to the speed multiplied by −24,+24: Black and white picture should appear on the color monitor.	(BID Level Check) TRIG: REF.VIDEO CONNECTION 2

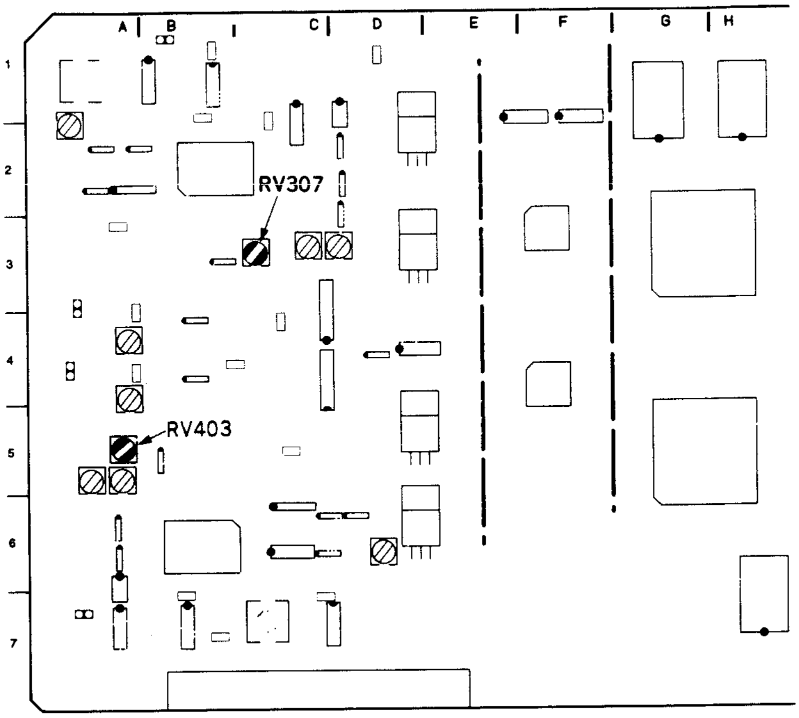
12-4. Y and C WCK FREQUENCY ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
Step1 • Set S700-4 (COLOR MUTE) on the TBC-18 board to ON. • Play back the color bars signal with dropout portion (26: 00—28: 00) of the alignment tape CR5-1B PS. • CHARACTER switch (sub control panel): OFF • Connect a picture monitor to the VIDEO OUT 3 connector. • After adjustment is completed, set S700-4 on the TBC-18 board to OFF.	VIDEO OUT 3 picture monitor  Adjust to a straight line.	(Y WCK Adjustment) (Y FREQ) ⊘RV307/TBC-18 (C-3) TRIG: REF. VIDEO CONNECTION 2
Step2 • Set S700-3 (Y MUTE) on the TBC-18 board to ON. • Play back the color bars signal with dropout portion (26: 00—28: 00) of the alignment tape CR5-1B PS. • CHARACTER switch (sub control panel): OFF • Connect a picture monitor to the VIDEO OUT 3 connector. • After adjustment is completed, set S700-3 on the TBC-18 board to OFF. • CHARACTER switch (sub control panel): ON	VIDEO OUT 3 picture monitor  Adjust to a straight line.	(C WCK Adjustment) (C FREQ) ⊘RV403/TBC-18 (A-5) TRIG: REF. VIDEO CONNECTION 1

TBC-18 board



APPLICATION : 12-4.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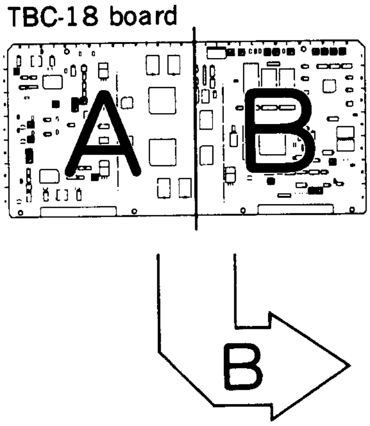
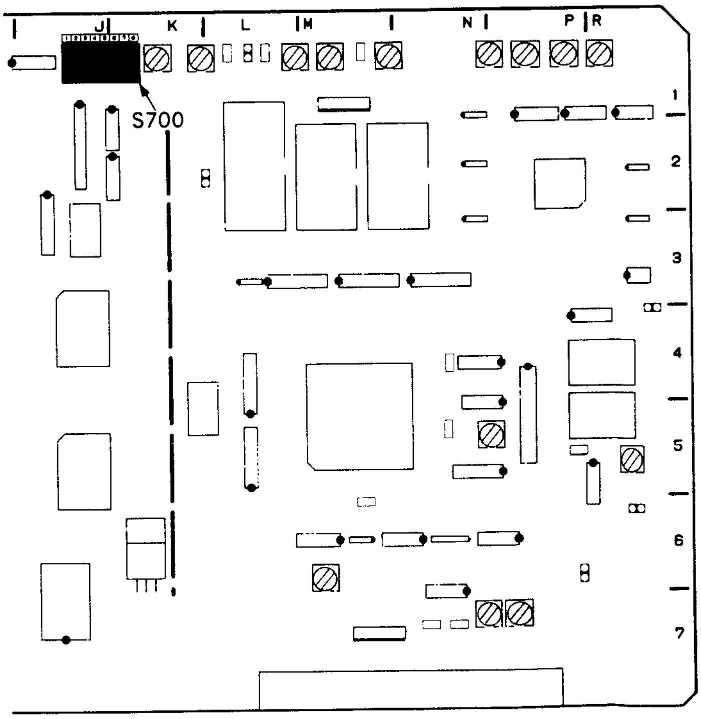
RV307
RV403

TBC-18 board



APPLICATION : 12-4.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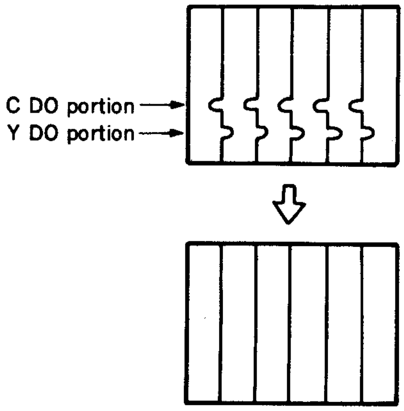
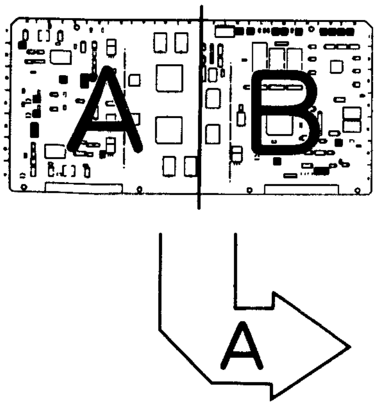
S700

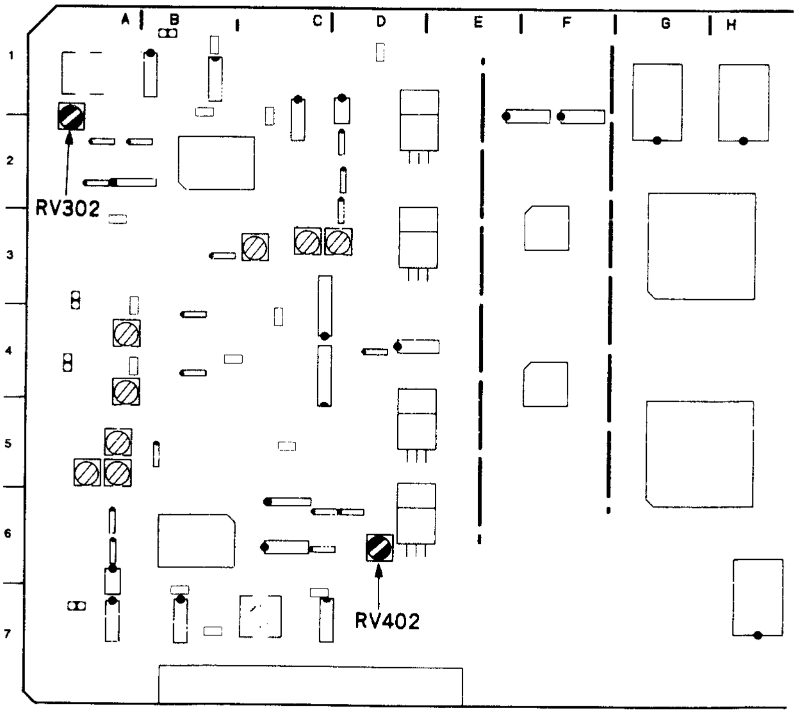
12-5. Y and C ERROR OFFSET ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal with drop out portion (26:00—28:00) of the alignment tape CR5-1B PS. • CHARACTER switch (sub control panel): OFF • Connect a picture monitor to VIDEO OUT 3 connector.	VIDEO OUT 3 picture monitor  C DO portion Y DO portion	(A) (Y ERR CLIP) ⊘RV302/TBC-18(A-2) (B) (C ERR CLIP) ⊘RV402/TBC-18(D-6)
• After adjustment is completed, set the CHARACTER switch to ON.	(A) The Y DO portions should disappear on the monitor display by RV302. (B) The C DO portions should disappear on the monitor display by RV402.	CONNECTION 1

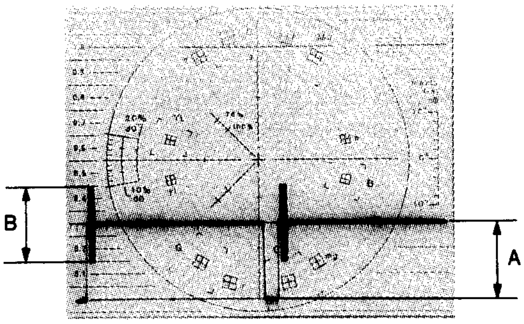
TBC-18 board



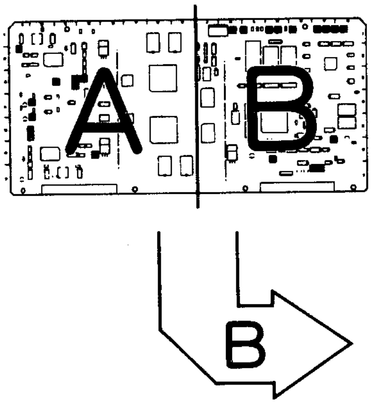
APPLICATION : 12-5.



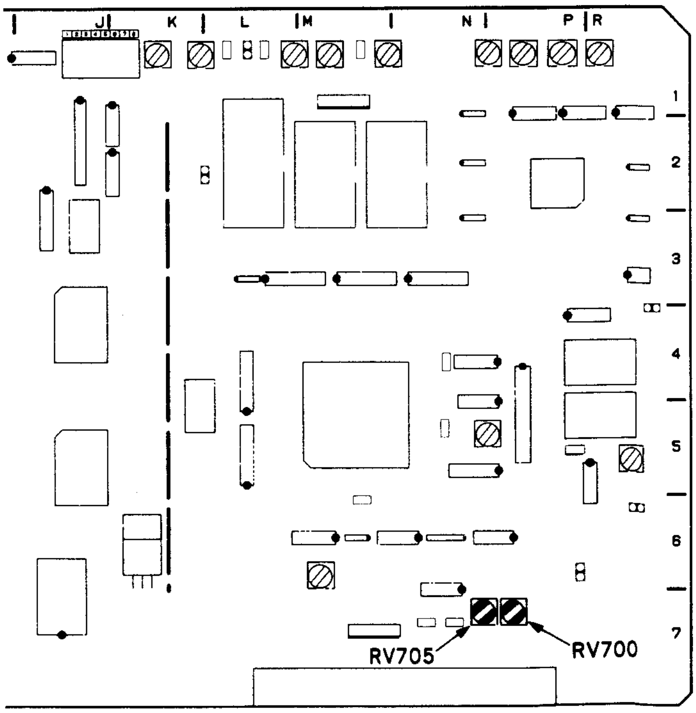
12-6. INT REF. VIDEO OUT LEVEL ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
• Connect the waveform monitor to REF. VIDEO OUTPUT connector. • Disconnect the REF. VIDEO INPUT connector to put the unit into INT REF. mode. • After adjustment is completed, connect the REF VIDEO INPUT connector.	REF.VIDEO OUT waveform monitor  A=300.0±1.5 mV p-p B=300.0±1.5 mV p-p	(A) (SYNC LEVEL) ⊘RV700/TBC-18(P-7) (B) (BURST LEVEL) ⊘RV705/TBC-18(N-7) TRIG: REF.VIDEO CONNECTION 2

TBC-18 board

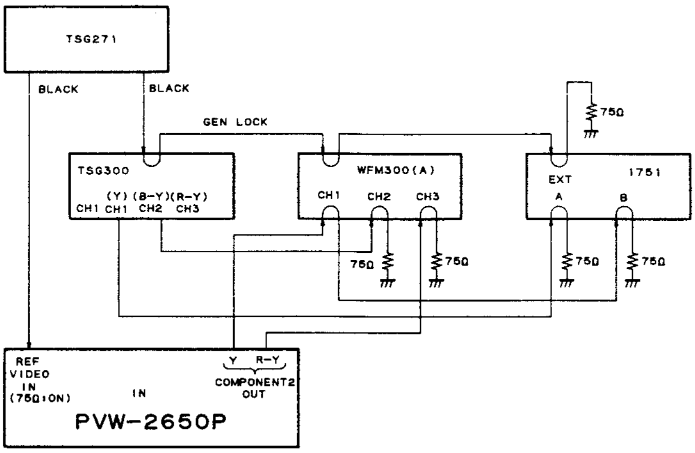


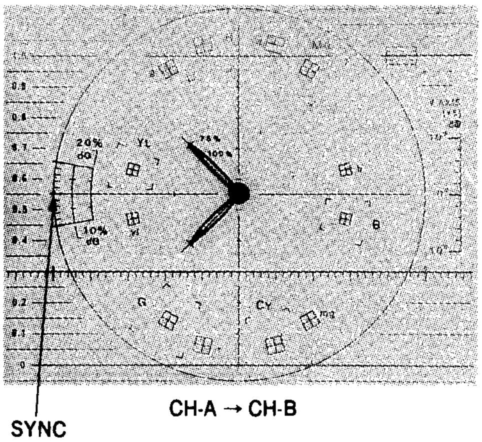
APPLICATION : 12-6.

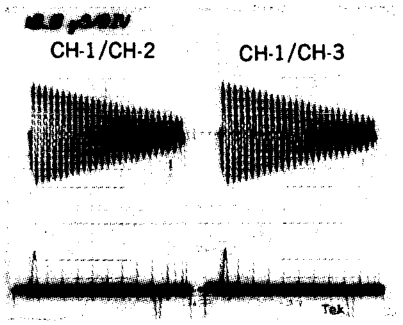
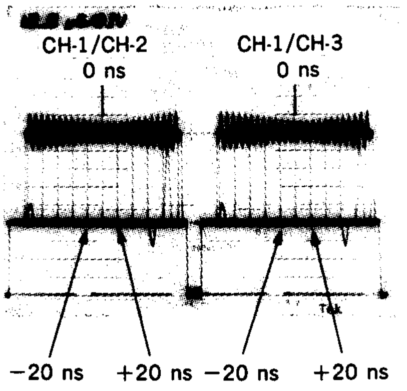


12-7. PB VIDEO PHASE ADJUSTMENT

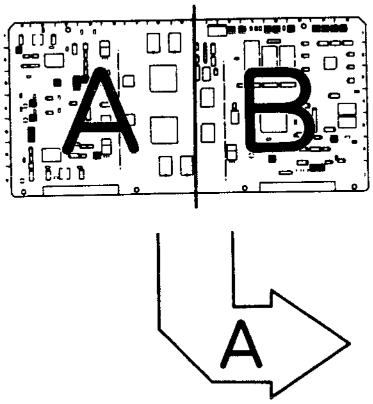
[CONNECTION]


TSG271
BLACK
BLACK
GEN LOCK
75Ω
TSG300
(Y) (B-Y)(R-Y)
CH1 CH1 CH2 CH3
WFM300(A)
CH1 CH2 CH3
EXT
1751
A B
75Ω
75Ω
75Ω
75Ω
REF VIDEO IN (75Ω:ON)
IN
Y R-Y
COMPONENT2 OUT
PVW-2650P

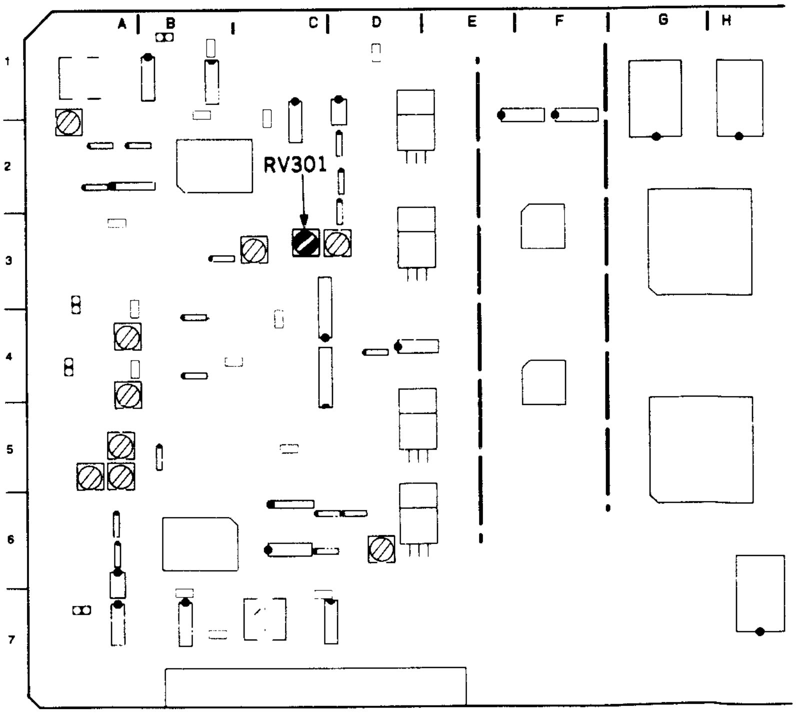
Preparations for adjustment	Specifications	Adjustments
• CAPSTAN LOCK switch (sub control panel): 2FD • Connect the CH-A of a waveform/vector monitor to the CH-1 (Y) of a component signal generator. • Turn the signal of the component signal generator into bowtie signal. • Play back the bowtie signal portion (17:00—19:00) of the alignment tape CR5-1B PS. Step 1 • Use the waveform/vector monitor as a vectorscope.	COMPONENT2 Y OUT VECTOR mode  CH-A → CH-B 1. Set the SYNC control on the sub control panel to the mechanical center. 2. Use 1751's PHASE control to adjust the SYNC phase of CH-A as shown above. 3. Change the CH-A to CH-B of 1751. Then, make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note: The dot position should be adjusted in the direction of the shortest movement.)	SYNC control /sub control panel TRIG: EXT/WFM

Preparations for adjustment	Specifications	Adjustments
- CAPSTAN LOCK switch (sub control panel): 2FD - Connect the CH-A of a waveform/vector monitor to the CH-1 (Y) of a component signal generator. - Turn the signal of the component signal generator into bowtie signal. - Play back the bowtie signal portion (17: 00—19: 00) of the alignment tape CR5-1B PS. Step2 Set the waveform monitor to BOWTIE mode.	COMPONENT 2 Y OUT BOWTIE mode/PARADE **Before adjustment**  ⇩ **After adjustment**  Set the BOWTIE DIP point (cross points of the CH-1/CH-2) on the center marker. 0±10 ns	(Y PHASE) ⊘RV301/TBC-18(C-3) TRIG: EXT/WFM

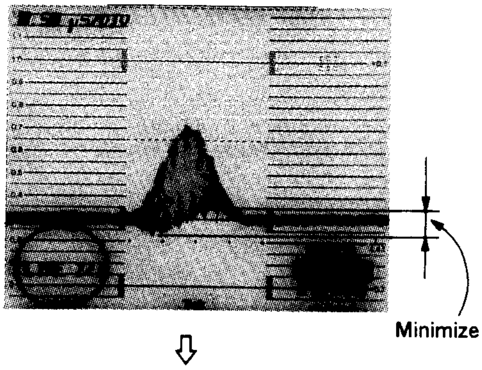
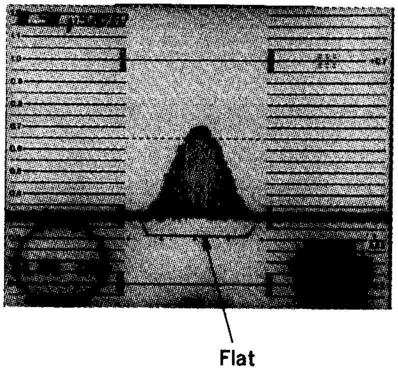
TBC-18 board



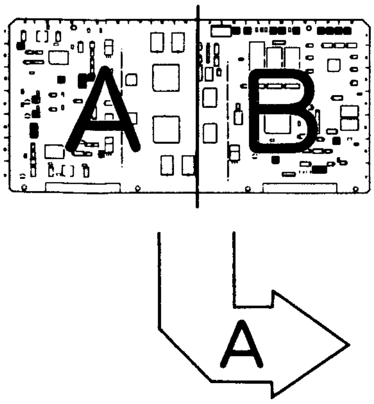
APPLICATION : 12-7.

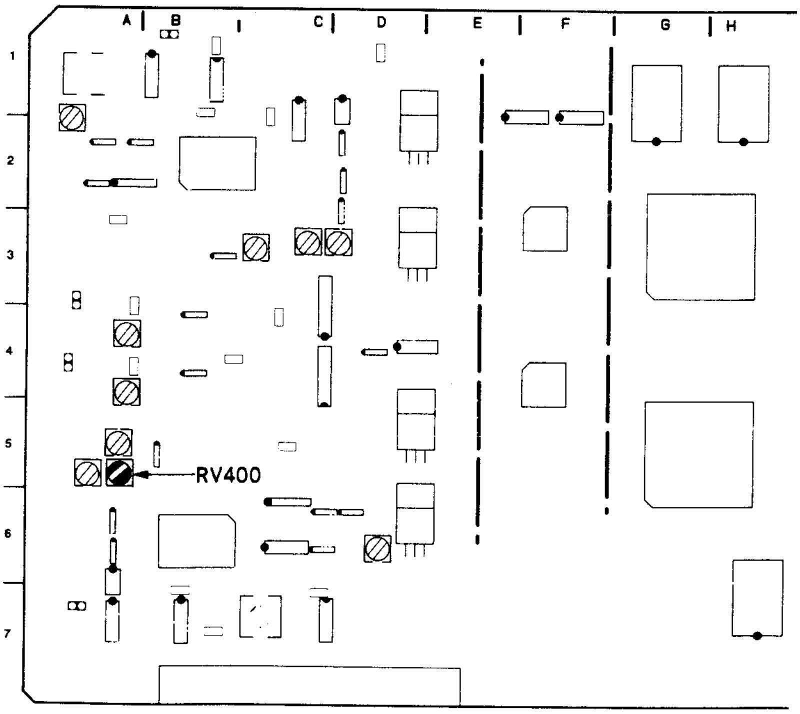


12-8. PB COMPOSITE Y/C DELAY ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
- CAPSTAN LOCK switch (sub control panel): 2FD - Connect a waveform monitor to VIDEO OUT 1 connector. - Play back the 10T pulse of bowtie signal portion (17:00—19:00) of the alignment tape CR5-1B PS. - Select 195 line with the line selector of the waveform monitor.	VIDEO OUT 1 waveform monitor Before adjustment  ⇩ After adjustment 	(Y/C DELAY) ⊘RV400/TBC-18(A-5) TRIG: INT/WFM CONNECTION 2

TBC-18 board

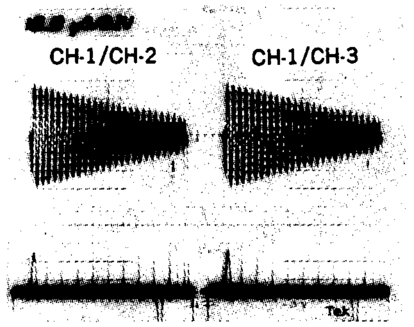
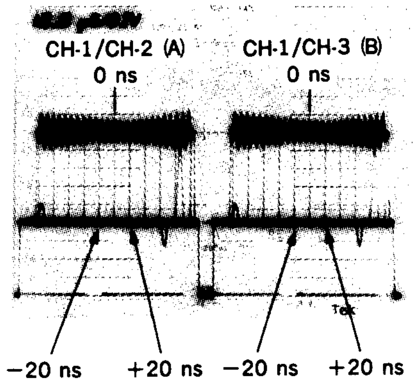




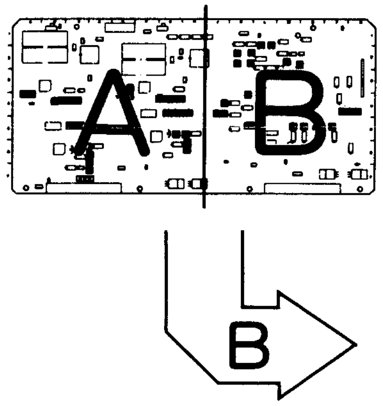
APPLICATION : 12-8.

12-9. PB COMPONENT Y/C DELAY ADJUSTMENT

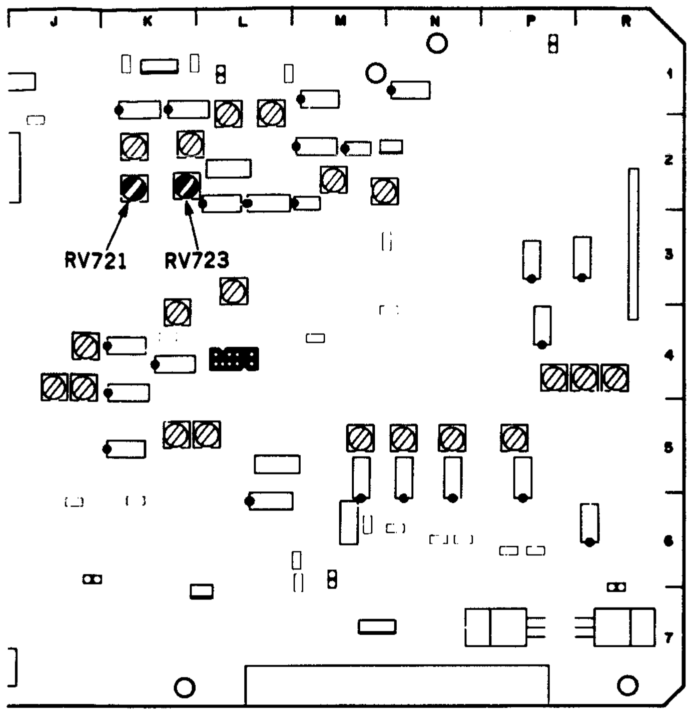
Before the adjustment, PB Composite Y/C Delay Adjustment in Section 12-8 should be completed.

Preparations for adjustment	Specifications	Adjustments
• CAPSTAN LOCK switch (sub control panel): 2FD Step1 • Play back the bowtie signal portion (17:00—19:00) of the alignment tape CR5-1B PS.	COMPONENT 2 OUT BOWTIE mode/PARADE **Before adjustment**  ⇩ **After adjustment**  Set the each BOWTIE DIP point of (A) and (B) on the center marker. 0±10 ns	(A) (B-Y DELAY) ⊘RV723/VP-33(K-2) (B) (R-Y DELAY) ⊘RV721/VP-33(K-2) TRIG: EXT/WFM CONNECTION 1
Step2 • Play back the bowtie signal portion (6:00—9:00) of the alignment tape CR5-2A PS.	COMPONENT 2 OUT BOWTIE mode/PARADE Make the BOWTIE DIP points on CH-1/CH-2 and CH-1/CH-3 coincide with the center markers within the following range: 0±10 ns	(Oxide DELAY) ⊘RV401/TBC-18(A-5) TRIG: EXT/WFM CONNECTION 1

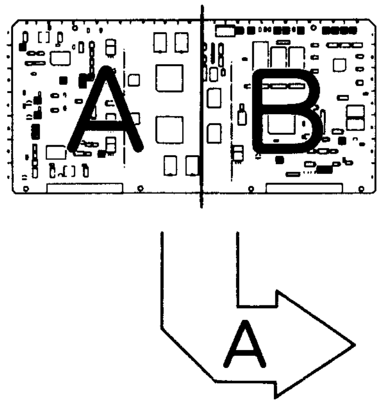
VP-33 board



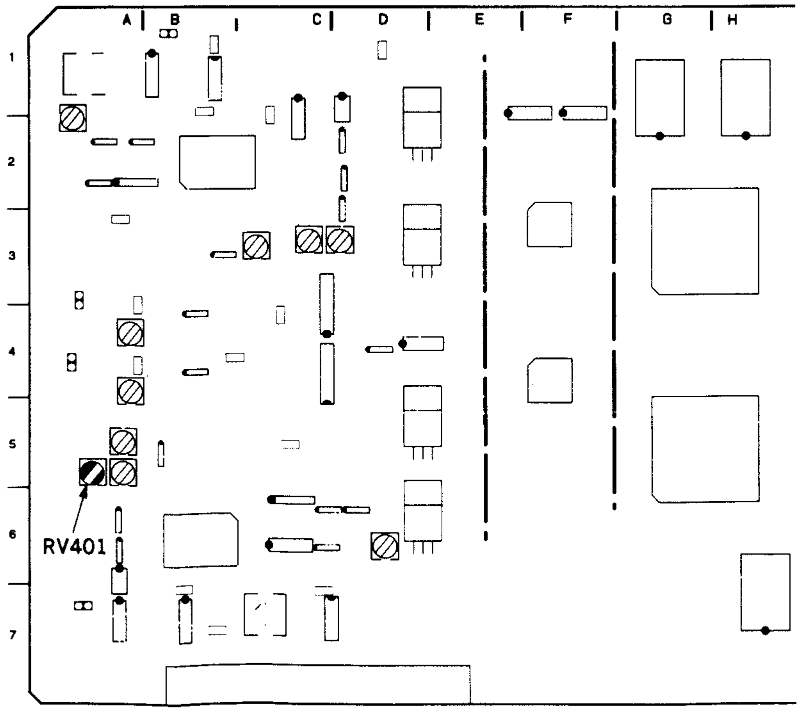
APPLICATION: 12-9.



TBC-18 board

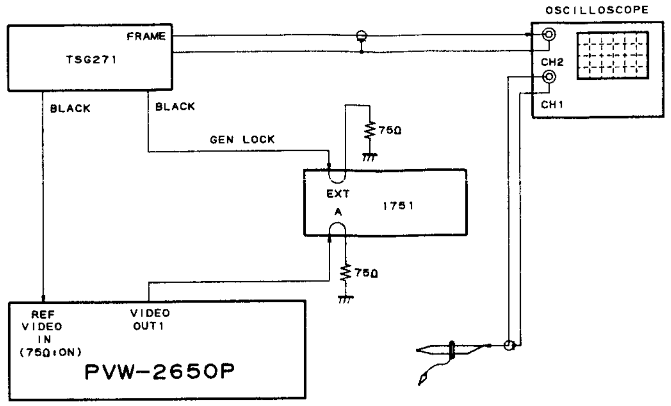


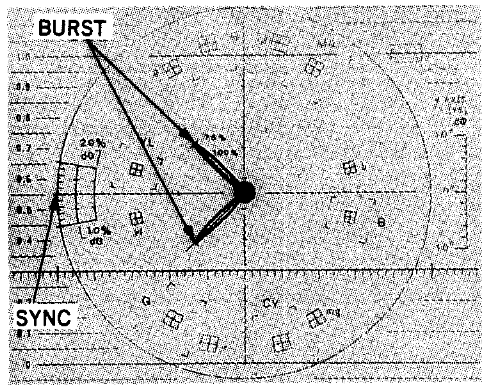
APPLICATION: 12-9.



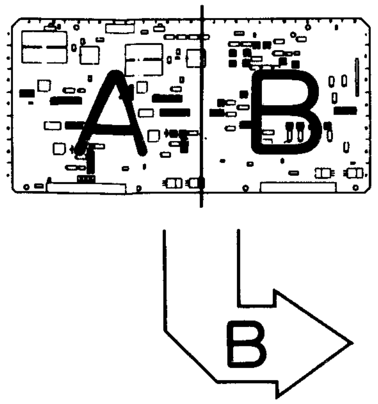
12-10. ENCODE CF PHASE ADJUSTMENT

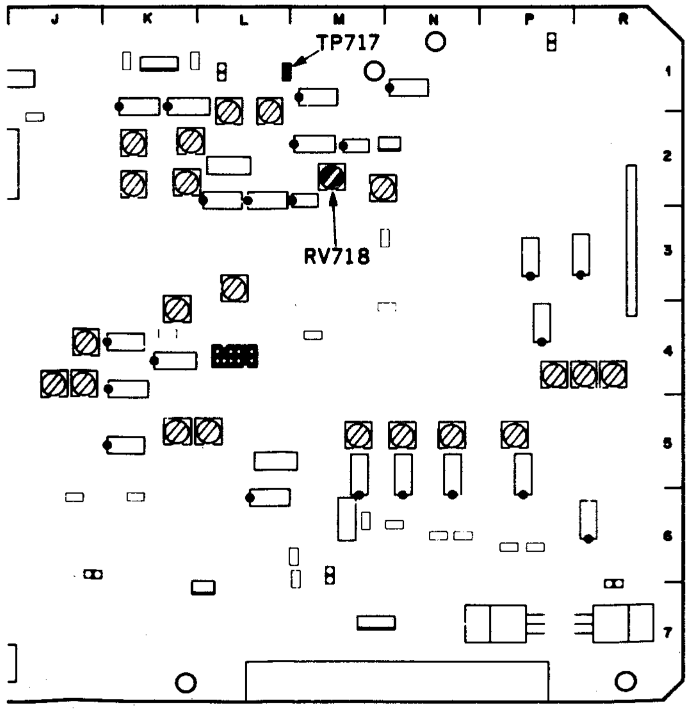
[CONNECTION]


OSCILLOSCOPE
TSG271
FRAME
CH2
CH1
BLACK
BLACK
GEN LOCK
75Ω
EXT
A
1751
75Ω
REF VIDEO IN (75Ω:ON)
VIDEO OUT1
PVW-2650P

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • SC control (sub control panel): mechanical center	Step1 VIDEO OUT 1 VECTOR mode  (A) Set the dot of the burst on the normal position on the scale. (B) Adjust the SYNC to the normal position (SCH=0°).	(A) Burst Adjustment PHASE Control/Vectorscope (B) SYNC Adjustment SYNC control/sub control panel TRIG: EXT/WFM

VP-33 board




J
K
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TP717
RV718
1
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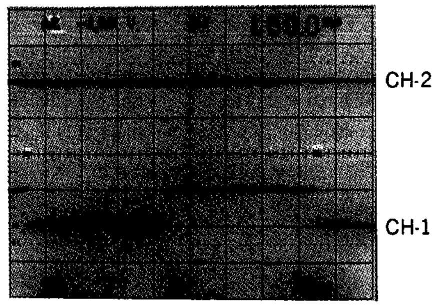
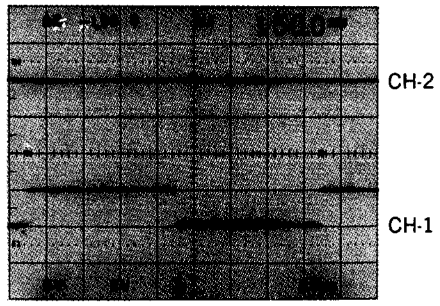
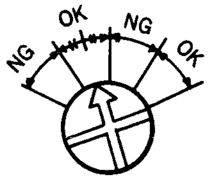
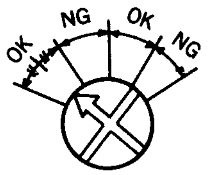
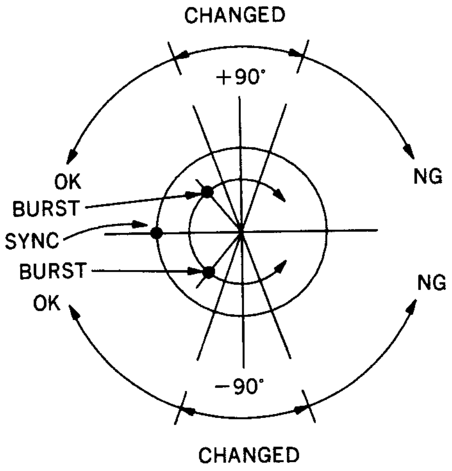
7

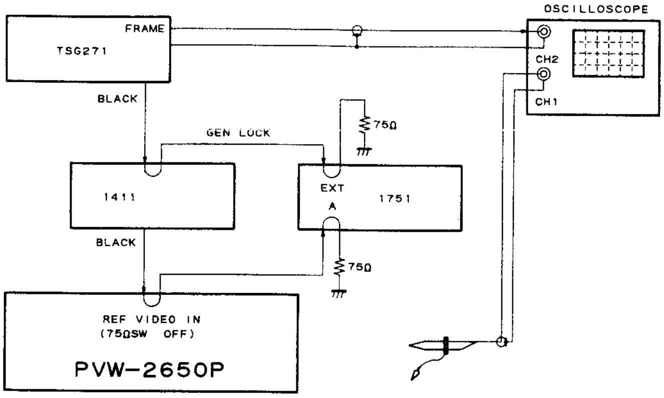
APPLICATION : 12-10. Step2

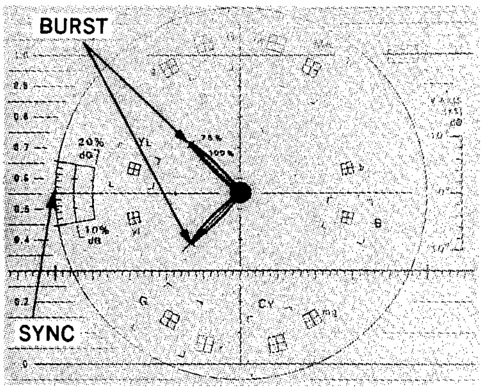
Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS. • SC control (sub control panel): mechanical center	Step2 CH-1 : TP717/VP-33(L-1) CH-2 : FRAME PULSE terminal/TSG271 oscilloscope (NG)  ⇩ (OK)  (1) Turn RV718 counterclockwise fully. (2) When RV718 is turned clockwise gradually, the phase condition between CH1 and CH2 changes from NG to OK or OK to NG. (3) In case of the pattern of change is started from NG as shown in the following illustration, set RV718 to mechanical center of range of first OK. NG → OK → NG → OK ↑ the mechanical center of this range  (4) In case of the pattern of change is started from OK as shown in the following illustration, set RV718 to mechanical center of range of first OK. OK → NG → OK → NG ↑ the mechanical center of this range  * If the range of first OK is extremely narrow, set to mechanical center of range of second OK.	(CF ADJ) ●RV718/VP-33(M-2) TRIG: CH-2

Preparations for adjustment	Specifications	Adjustments
• Play back the color bars signal portion (14:00—17:00) of the alignment tape CR5-1B PS.	Step3 While monitoring the burst phase with the vectorscope described in Step1, observe the CF phase for normal/inverted condition by the oscilloscope waveforms described in Step2. Check whether the adjustment position is in the center of the OK range or not. Use the SC control on the sub control panel to move the burst phase ±90° or more. Verify the following conditions are met:  CHANGED +90° OK BURST SYNC BURST OK NG NG −90° CHANGED The CF phase changes from OK to NG within the range of +90±20°. The CF phase changes from OK to NG within the range of −90±20°. If the specification is not satisfied, check the deviation form the specification and perform the adjustment in Step 2, then perform Step3 and confirm. Repeat this procedure until the specification is satisfied.	(Adjustment Position Check)

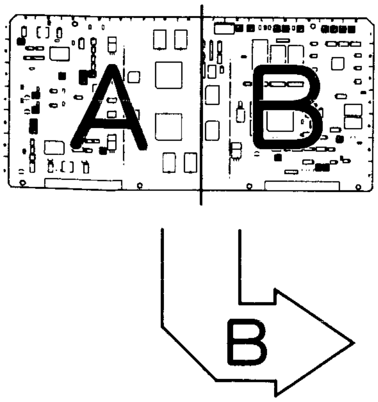
12-11. REFERENCE CF PHASE ADJUSTMENT

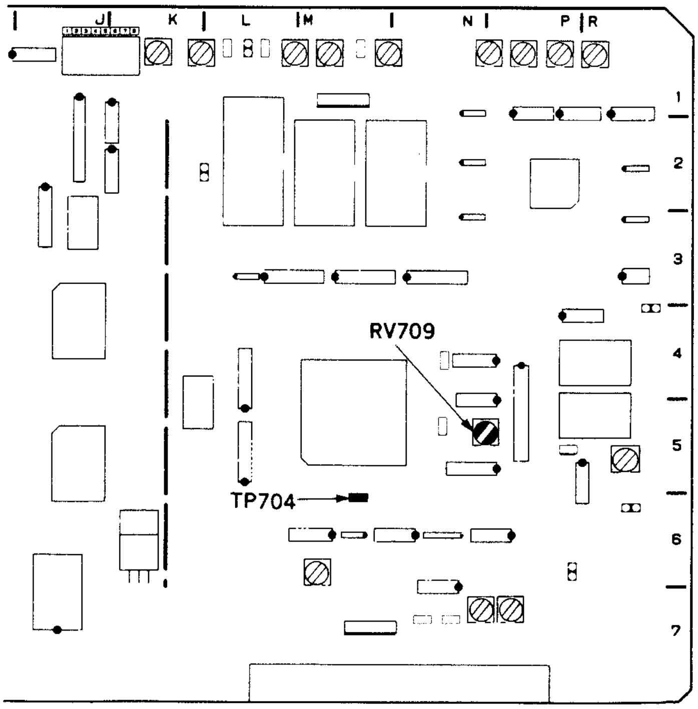
[CONNECTION]


OSCILLOSCOPE
FRAME
TSG271
CH2
CH1
BLACK
GEN LOCK
75Ω
1411
EXT
A
1751
BLACK
75Ω
REF VIDEO IN
(75ΩSW OFF)
PVW-2650P

Preparations for adjustment	Specifications	Adjustments
• Connect the equipments as shown in the upper figure.	Step1 REF VIDEO IN through out VECTOR mode  (A) Set the dot of the burst on the right position on the scale. (B) Adjust the SYNC to the normal position (SCH=0°).	(A) SYNC Adjustment PHASE Control/Vectorscope (B) Burst Adjustment SC control/1411 TRIG: EXT/WFM

TBC-18 board

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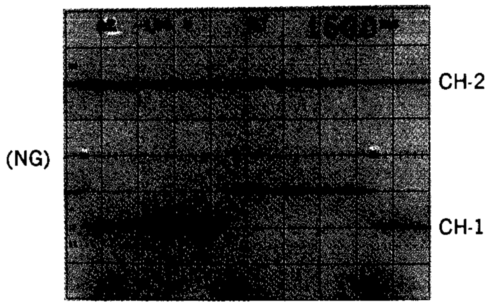
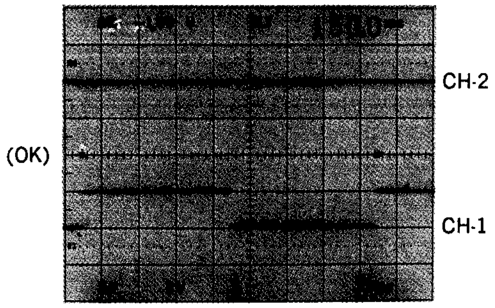
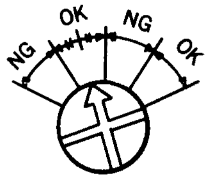
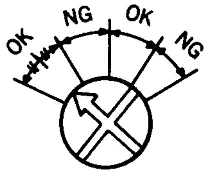
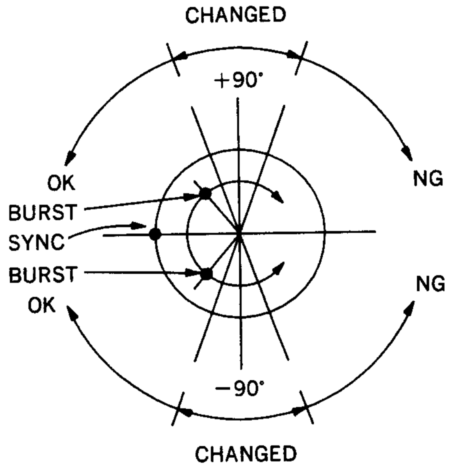
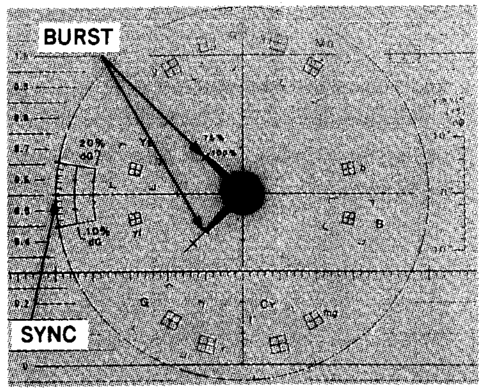
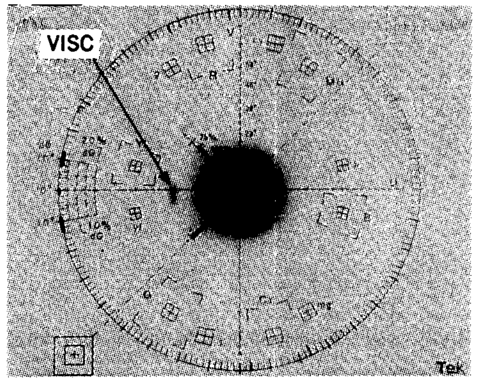
RV709
TP704

APPLICATION : 12-11. Step2

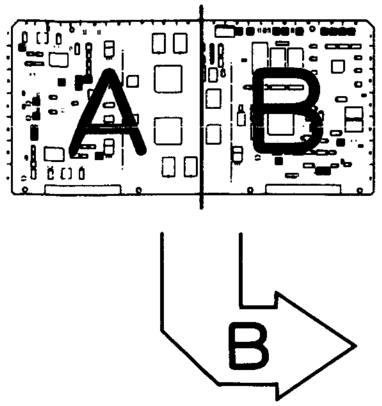
Preparations for adjustment	Specifications	Adjustments
	Step2 CH-1 : TP704(1ST FIELD)/TBC-18(M-6) CH-2 : FRAME PULSE terminal/TSG271 oscilloscope   (1) Turn RV709 counterclockwise fully. (2) When RV709 is turned clockwise gradually, the phase condition between CH1 and CH2 changes from NG to OK or OK to NG. (3) In case of the pattern of change is started from NG as shown in the following illustration, set RV709 to mechanical center of range of first OK. $\text{NG} \rightarrow \underbrace{\text{OK}}_{\uparrow} \rightarrow \text{NG} \rightarrow \text{OK}$ the mechanical center of this range  (4) In case of the pattern of change is started from OK as shown in the following illustration, set RV709 to mechanical center of range of first OK. $\underbrace{\text{OK}}_{\uparrow} \rightarrow \text{NG} \rightarrow \text{OK} \rightarrow \text{NG}$ the mechanical center of this range  * If the range of first OK is extremely narrow, set to mechanical center of range of second OK.	(1ST FIELD) ⊘RV709/TBC-18(N-5) TRIG: CH-2

Preparations for adjustment	Specifications	Adjustments
	Step3 While monitoring the burst phase with the vectorscope described in Step1, observe the CF phase for normal/inverted condition by the oscilloscope waveforms described in Step2. Check whether the adjustment position is in the center of the OK range or not. Use SC control on the 1411 to move the burst phase ±90° or more. Verify the following conditions are met:  CHANGED +90° OK BURST SYNC BURST OK NG NG −90° CHANGED The CF phase changes from OK to NG within the range of +90±20°. The CF phase changes from OK to NG within the range of −90±20°. If the specification is not satisfied, check the deviation form the specification and perform the adjustment in Step2, then perform Step3 and confirm. Repeat this procedure until the specification is satisfied.	(Adjustment Position Check)

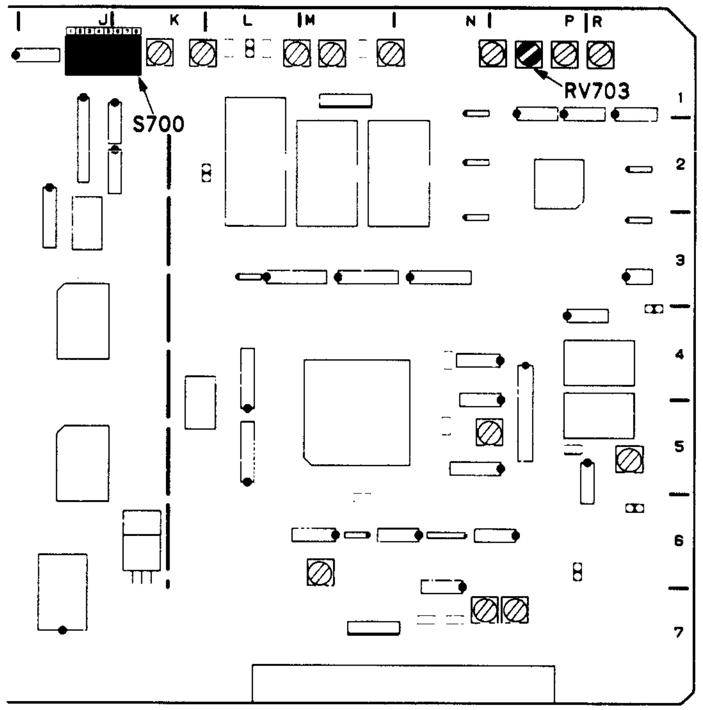
12-12. VISC LOCK IN ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
• Connect the waveform/vector monitor to VIDEO OUT 1 connector. • Set the S700-6 (VISC TEST)(K-1) on TBC-18 board to ON. Step1 • Play back the composite H sweep signal with VISC portion (28:00—30:00) of the alignment tape CR5-1B PS. • CAPSTAN LOCK switch (sub control panel): 8FD	VIDEO OUT1 VECTOR mode (A)  (B), (C)  (LINE 8) (A) Adjust the SYNC and BURST to the each normal position. (B) Check that the VISC is within ±45°, when the CAPSTAN LOCK switch is set to 2FD. (C) Set the CAPSTAN LOCK switch to 8FD, then align the VISC in the same phase as the burst.	(A) SYNC Adjustment SYNC control/ sub control panel Burst Adjustment SC control/ sub control panel (C) (VISC P) ●RV703/TBC-18(P-1) TRIG: INT/WFM CONNECTION 2
Step2 • Set the S700-6(K-1) on the TBC-18 board to OFF.	Check that the VISC should disappear.	TRIG: INT/WFM CONNECTION 2

TBC-18 board

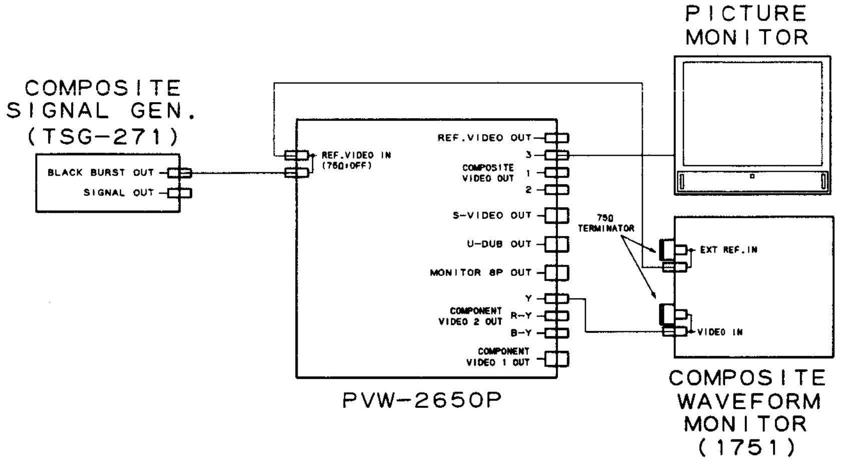


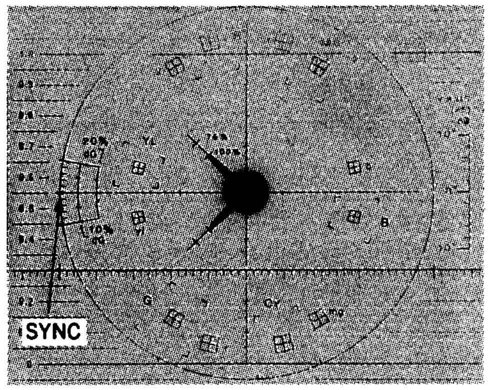
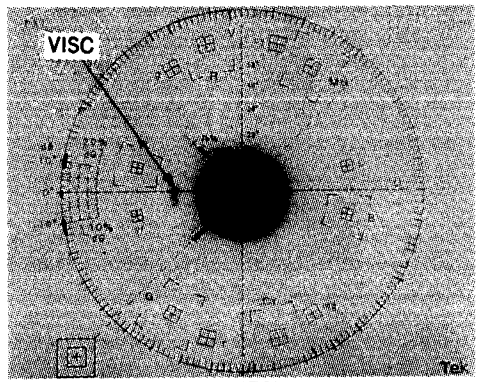
APPLICATION: 12-12



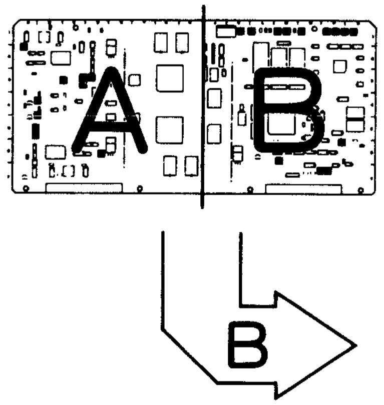
12-13. VISC REGEN PHASE ADJUSTMENT

[CONNECTION]

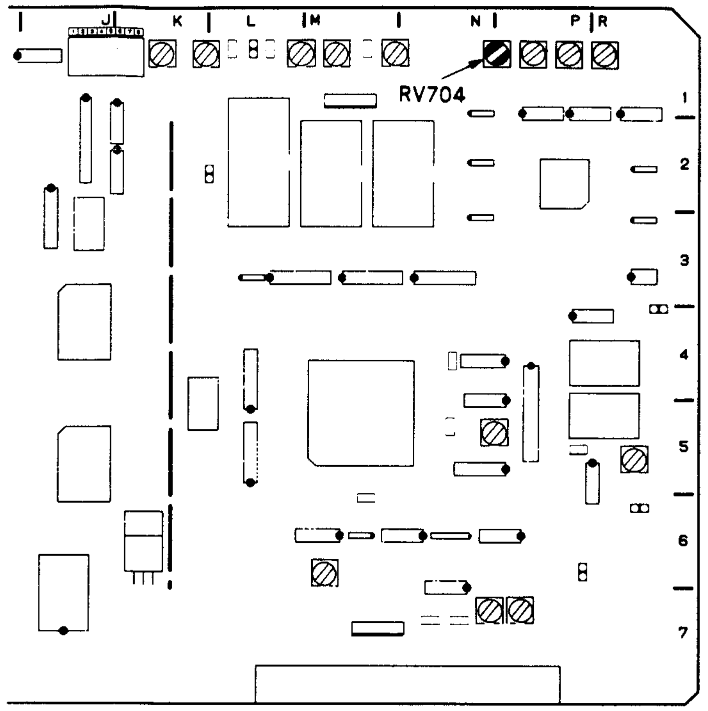

PICTURE MONITOR
COMPOSITE SIGNAL GEN. (TSG-271)
BLACK BURST OUT
SIGNAL OUT
REF.VIDEO IN (75Ω:OFF)
REF.VIDEO OUT
COMPOSITE VIDEO OUT
3
1
2
S-VIDEO OUT
U-DUB OUT
MONITOR 8P OUT
COMPONENT VIDEO 2 OUT
Y
R-Y
B-Y
COMPONENT VIDEO 1 OUT
75Ω TERMINATOR
EXT REF.IN
VIDEO IN
PVW-2650P
COMPOSITE WAVEFORM MONITOR (1751)

Preparations for adjustment	Specifications	Adjustments
• Connect a waveform/vector monitor to COMPONENT 2 Y OUT connector. • Play back the composite H sweep signal with VISC portion (28:00—30:00) of the alignment tape CR5-1B PS. • CAPSTAN LOCK switch (sub control panel): 8FD	COMPONENT 2 Y OUT VECTOR mode (A)  (B)  (LINE8) (A) The SYNC dot should be on the position shown above. (B) The VISC should be in the same phase as the SYNC.	(A) SYNC Adjustment PHASE Control/Vectorscope (B) (VISC R) ➐RV704/TBC-18(P-1) TRIG: INT/WFM

TBC-18 board



APPLICATION: 12-13.


J
K
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RV704
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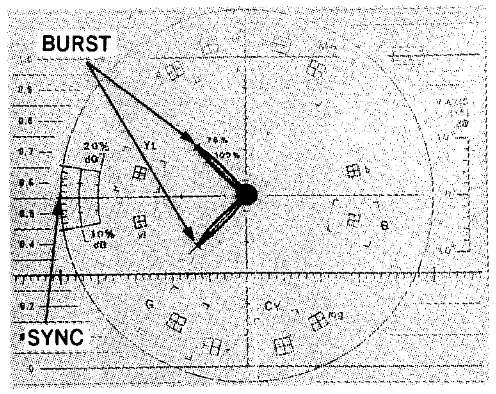
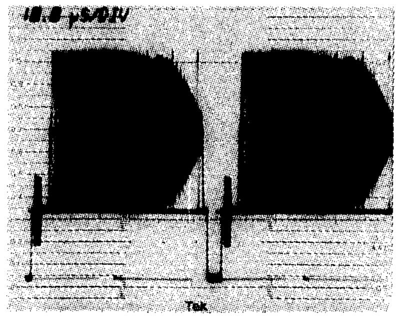
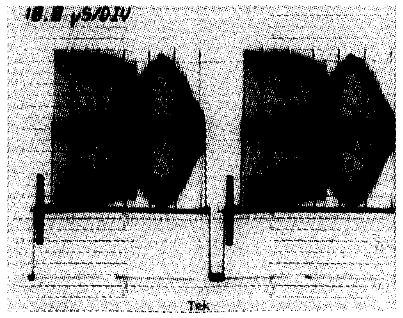
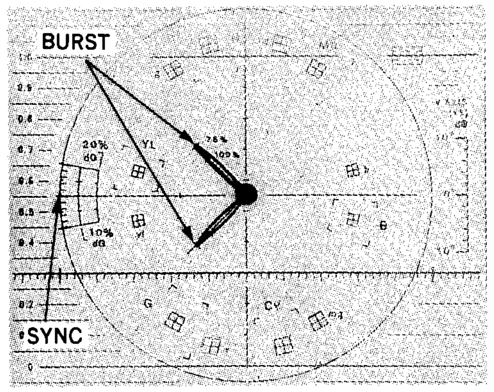
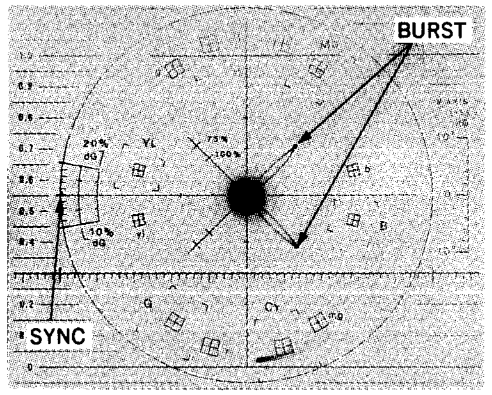
12-14. VISC TRACKING CHECK

Preparations for adjustment	Specifications	Adjustments
• Connect a waveform/vector monitor to VIDEO OUT 1 connector. • Play back the composite H sweep signal with VISC portion (28:00—30:00) of the alignment tape CR5-1B PS. • CAPSTAN LOCK switch (sub control panel): 8FD	Step1 VIDEO OUT 1 VECTOR mode  Adjust the SYNC and BURST to the each normal position (SCH=0°).	(SYNC Adjustment) PHASE control/vectorscope (Burst Adjustment) SC control/sub control panel TRIG: INT/WFM CONNECTION 2
	Step2 VIDEO OUT 1 Switch the mode from playback to stop and then back to playback, and observe the waveform of the waveform monitor. OK  NG  Perform this procedure five times. The waveform observed should be accepted each time this is made.	(Tracking Check) TRIG: INT/WFM CONNECTION 2

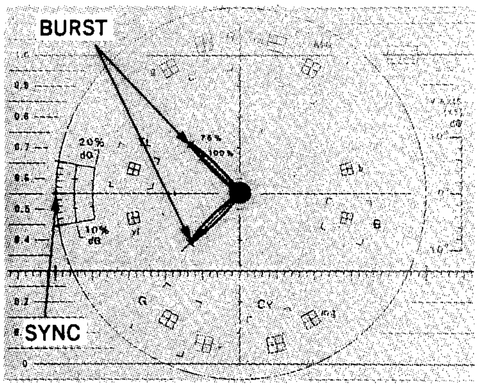
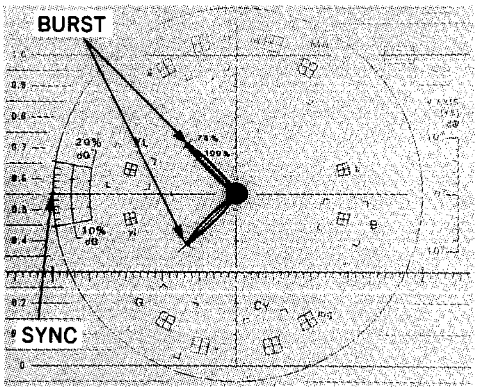
12-15. H SHIFT CHECK

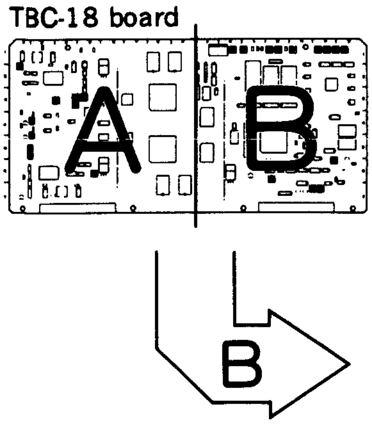
Preparations for adjustment	Specifications	Adjustments
• Connect a waveform/vector monitor to VIDEO OUT 1 connector. • Connect a picture monitor to VIDEO OUT 3 connector. • Play back the composite H sweep signal with VISC portion (28:00—30:00) of the alignment tape CR5-1B PS.	Step1 VIDEO OUT 1 Adjust the SYNC and BURST to the each normal position (SCH=0°).  When setting the CAPSTAN LOCK switch on the sub control panel between 2FD and 8FD, picture on the picture monitor should be no H shift.	(SYNC Adjustment) PHASE control/vectorscope (Burst Adjustment) SC control/sub control panel TRIG: INT/WFM CONNECTION 2
	Step2 VIDEO OUT 1 Invert the burst phase on the vectorscope.  When setting the CAPSTAN LOCK switch on the sub control panel between 2FD and 8FD, picture on the picture monitor should be H shift as follows: CAP.SW. 2FD 8FD picture shift left side right side After check is completed, set the CAPSTAN LOCK switch to 8FD. Then use the SC control to return to the state defined in Step 1.	(Burst Phase) SC control/sub control panel TRIG: INT/WFM CONNECTION 2

12-16. NO BURST REF IN CHECK

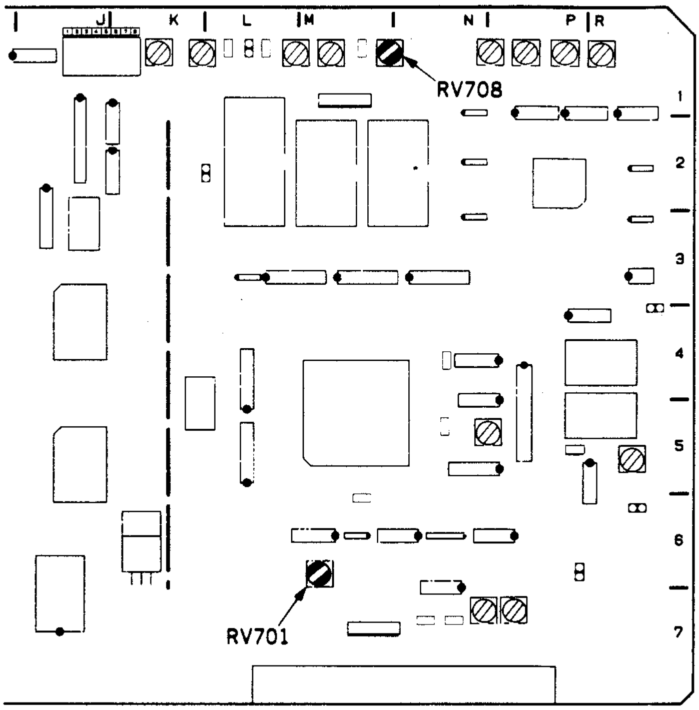
Preparations for adjustment	Specifications	Adjustments
• Supply a video signal without burst to REF. VIDEO INPUT connector. • Connect a picture monitor to VIDEO OUT 3 connector. • Play back the composite H sweep signal with VISC portion (28:00—30:00) of the alignment tape CR5-1B PS. • CAPSTAN LOCK switch (sub control panel): 8FD	VIDEO OUT 3 picture monitor H Shift should not be done. (If the unit is breakdown, H shift appears repeatedly to the right and left.)	(H Shift Check) CONNECTION 2

12-17. INT SCH PHASE ADJUSTMENT

Preparations for adjustment	Specifications	Adjustments
- Disconnect the REF. VIDEO INPUT connector and put the unit into INT REF. mode. - Connect CH-A of a vectorscope to VIDEO OUT 1 connector, and CH-B to REF. VIDEO OUT connector.	Step1 VIDEO OUT 1 VECTOR mode CH-A  (A) Set the dot of the burst on the normal position on the scale. (B) Adjust the SYNC to the normal position (SCH=0°).	(A) Burst Adjustment PHASE control/Vectorscope (B) (INT SC) ⊘RV708/TBC-18(M-1) TRIG: INT/WFM CONNECTION 2
- After adjustment is completed, connect the REF. VIDEO INPUT connector.	Step2 REF.VIDEO OUT VECTOR mode CH-B  (A) Set the dot of the burst on the normal position on the scale. (B) Adjust the SYNC to the normal position (SCH=0°).	(A) Burst Adjustment PHASE Control/Vectorscope (B) (SYNC PHASE) ⊘RV701/TBC-18(M-6) TRIG: INT/WFM CONNECTION 2


TBC-18 board
A
B
B

APPLICATION : 12-17.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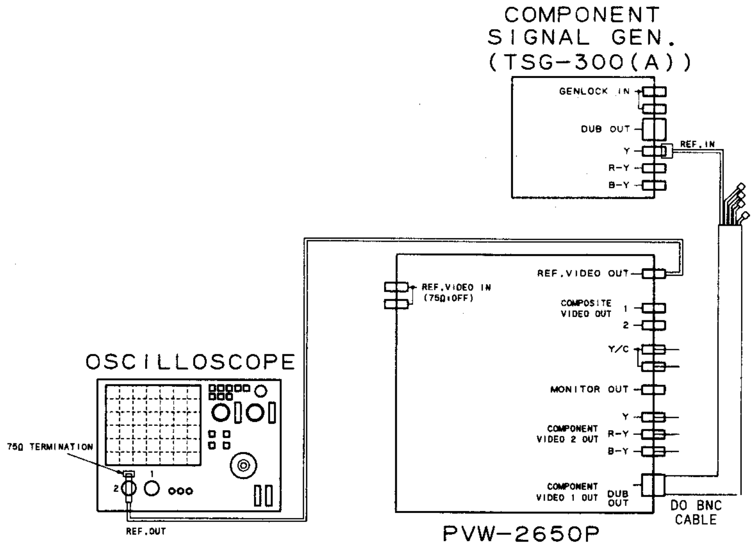
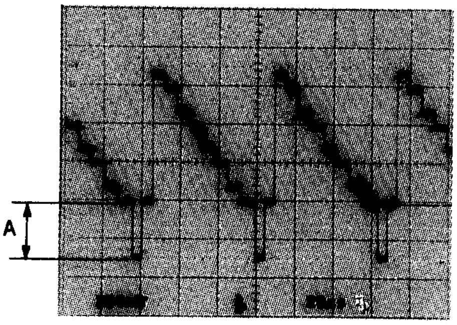
RV708
RV701

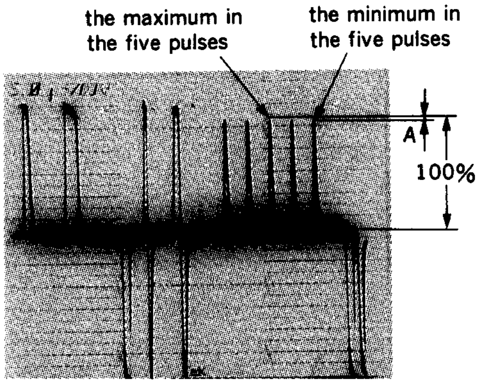
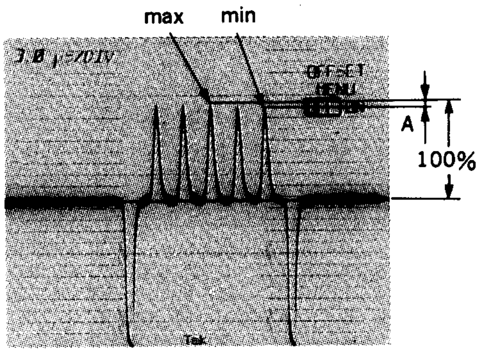
12-18. DUB OUT REF IN CHECK

[CONNECTION]


COMPONENT SIGNAL GEN. (TSG-300(A))
GENLOCK IN
DUB OUT
Y
R-Y
B-Y
REF.IN
REF.VIDEO OUT
REF.VIDEO IN (75Ω:OFF)
COMPOSITE VIDEO OUT
1
2
Y/C
MONITOR OUT
COMPONENT VIDEO 2 OUT
Y
R-Y
B-Y
COMPONENT VIDEO 1 OUT
DUB OUT
DO BNC CABLE
PVW-2650P
OSCILLOSCOPE
75Ω TERMINATION
1
2
REF.OUT

Preparations for adjustment	Specifications	Adjustments
• Supply a component color bars Y signal to the REF IN terminal (DUB OUT REF IN terminal) (9-10 (G)) of COMPONENT 1 OUTPUT connector. (Using the multi connector cable DOBNC.) • Connect the oscilloscope to the REF. VIDEO OUTPUT connector which is terminated at 75Ω. • Disconnect the REF. VIDEO INPUT connector. • After check is completed, connect the REF. VIDEO INPUT connector.	DUB IN REF OUT (terminated by 75Ω) oscilloscope  (1) A=300±30 mV p-p (2) Only Y signal of the color bars should appear.	(DUB REF Operation Check) TRIG: INT

12-19. PLAY BACK COMPONENT LINEARITY CHECK

Preparations for adjustment	**Specifications**	**Adjustments**
• Play back the LINE 17A signal portion (19: 00—22: 00) of the alignment tape CR5-1B PS. • Connect a waveform monitor 1781R to COMPONENT 2 Y OUTPUT connector. • Waveform monitor 1781R: DIFF/WFM mode	COMPONENT 2 Y OUT DIFF mode of the waveform monitor  A≦2.8%	(Y Linearity Check) TRIG: REF. VIDEO CONNECTION 1
• Play back the QUAD PHASE signal portion (22: 00—24: 00) of the alignment tape CR5-1B PS. • Connect the waveform monitor 1781R to COMPONENT 2 R-Y OUTPUT and B-Y OUTPUT connector. • Waveform monitor 1781R: DIFF/PARADE mode	COMPONENT 2 R-Y OUT/B-Y OUT DIFF mode of the waveform monitor  (1) in regard to R-Y OUT A≦3.8% (2) in regard to B-Y OUT A≦3.8%	(Y Linearity Check) TRIG: REF. VIDEO CONNECTION 1